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BUREAU OF FISHERIES

# REPORT OF

# THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR 1910

AND

# SPECIAL PAPERS

GEORGE M. BOWERS
Commissioner

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# CONTENTS.

REPORT OF THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR ENDED JUNE 30, 1910. Document 734, 40 p. (Issued November 25, 1910.)

THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1910. Document 740, 112 p. (Issued June 1, 1911.)

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES STEAMER ALBATROSS DURING THE PHILIPPINE EXPEDITION, 1907–1910. Document 741, 98 p. (Issued November 29, 1910.)

CONDITION AND EXTENT OF THE NATURAL OYSTER BEDS OF DELAWARE. By H. F. Moore. Document 745, 30 p., 1 chart. (Issued February 10, 1911.)

THE FISHERIES OF ALASKA IN 1910. By Millard C. Marsh and John N. Cobb. Document 746, 72 p. (Issued April 19, 1911.)

SPECIAL INVESTIGATION OF THE ALASKA FUR-SEAL ROOKERIES, 1910. By Harold Heath. Document 748, 22 p. (Issued November 10, 1911.)

THE FUR-SEAL FISHERIES OF ALASKA IN 1910. By Walter I. Lembkey. Document 749, 40 p. (Issued November 8, 1911.)

THE SALMON FISHERIES OF THE PACIFIC COAST. By John N. Cobb. Document 751, 180 p. (Issued November 25, 1911.)

# REPORT OF THE COMMISSIONER OF FISHERIES FOR THE FISCAL YEAR ENDED JUNE 30, 1910

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Bureau of Fisheries Document No. 734

# CONTENTS.


| | Page. |
|---|---|
| General considerations | 5 |
| Propagation of food fishes | 6 |
| Extent of work | 6 |
| Review of operations | 7 |
| New stations and improvements | 11 |
| Acclimatization and results of fish culture | 12 |
| Fish-cultural relations with States and foreign countries | 13 |
| Biological inquiries and experiments | 15 |
| Oyster investigations and surveys | 15 |
| Pearl-mussel investigations | 16 |
| Experiments in sponge culture | 17 |
| Study of fish diseases | 17 |
| Other inquiries and experiments | 18 |
| Marine biological laboratories | 19 |
| Alaska salmon service | 19 |
| Alaska fur-seal service | 21 |
| The fishery industries | 22 |
| Statistics and methods of the fisheries | 22 |
| Shad and alewife fisheries | 27 |
| Investigation of the mackerel fishery | 28 |
| Fisheries of Mississippi | 31 |
| Miscellaneous activities | 33 |
| Relations with other government bureaus | 33 |
| International fishery matters | 33 |
| Employment of vessels | 34 |
| Publications and library | 35 |
| Appropriations | 35 |
| Recommendations | 36 |
| Reorganization of personnel | 36 |
| Salaries and personnel | 36 |
| Sponge law | 37 |
| Extension of fish culture | 38 |
| Laboratory for the study of fish diseases | 39 |
| Fishery intelligence service | 40 |
| New building | 40 |

# REPORT

OF THE

# COMMISSIONER OF FISHERIES.

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DEPARTMENT OF COMMERCE AND LABOR,
BUREAU OF FISHERIES,
*Washington, August 24, 1910.*

SIR: I have the honor to submit herewith a report of the operations of the Bureau of Fisheries for the fiscal year ended June 30, 1910.

## GENERAL CONSIDERATIONS.

This Bureau was organized as the United States Fish Commission in February, 1871, and on June 30, 1910, therefore, it completed the fortieth fiscal year of its existence. Originally clothed solely with functions of investigation and inquiry into the reputed or real decrease in the food fishes of the coastal and interior waters, it soon manifested that it could perform important service in actually increasing the supply of such fishes. In recognition of this fact acts of Congress from time to time have enlarged the functions of the Bureau until to-day the purely practical work of increasing and conserving aquatic food resources through cultural and experimental operations has become the dominant feature of the Bureau's activities.

For a long while wholly relieved of executive control of the fisheries by reason of the constitutional reservation of that right to the States, the Bureau recently has been invested with the administration of the important fisheries of Alaska, including the entire control of the Pribilof Islands and the fur-bearing animals of the Territory at large.

The steady increase in the volume and importance of the Bureau's work has been especially rapid in the past ten years, and the fiscal year just closed, which witnessed a drastic change in the control of the seal herd, has added considerably to the sum of the Bureau's duties. The probable adoption of joint international regulations in respect to the fisheries of the waters contiguous to our northern boundary presents the possibility of a great enlargement of the

Bureau's executive functions in the near future. Each year brings increasing demands from the several States for aid and advice in respect to the drafting of laws and regulations, the establishment of state fishery services, and the best measures for the conservation and development of fishery resources, and the Bureau feels that its influence for good in matters relating to the fisheries is yearly becoming more important. The salient features of the work during the fiscal year are exhibited in the following pages.

## PROPAGATION OF FOOD FISHES.

### EXTENT OF WORK.

It is gratifying to be able to record another successful year in fish-cultural work. Methods have not varied appreciably from those of former years, and attention has been directed principally to enlarging the output.

The widespread and increasing interest taken in the Bureau's work by people in all sections of the country and the growing conception of the benefits resulting from the stocking of public and private waters are manifested by the large number of applications for fish received during the year, the number being 10,635, an increase of 523 over 1909.

Work was conducted at 35 permanent stations and 86 field and collecting stations, located in 32 States. With reference to the fishes propagated, the regular hatcheries may be classified as follows: Marine species, 3; river fishes of the eastern seaboard, 5; fishes of the Pacific coast, 5; fishes of the Great Lakes, 7; fishes of the interior, 15.

The results of fish culture depend largely upon climatic conditions, the most elaborate and carefully executed plans ending in success or failure according to the state of the weather in the spawning season. In 1910 these conditions were generally unfavorable, resulting in the curtailment of egg collections of most of the important species, but owing to the superior quality of the majority of the eggs obtained, the Bureau was able to exceed its record year of 1909 by 126,800,000, or 4 per cent, the total output of fish and eggs being in excess of 3,233,000,000. This was accomplished without increased funds, the available appropriations being the same as in the preceding two years, and was made possible largely through the faithful and efficient service rendered by the Bureau's employees in their several lines of work.

The following is a table summarizing the distribution of fish and fish eggs for the year. Of these, 443,177,000 eggs and 7,425 fish were delivered to various state fish commissions, and 600,000 eggs of salmon and trout were shipped to foreign countries.

SUMMARY OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR ENDED JUNE 30, 1910.

| Species. | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Total. |
|---|---|---|---|---|
| Catfish | | | 544,350 | 544,350 |
| Carp | | | 22,710 | 22,710 |
| Buffalofish | | | 201,475 | 201,475 |
| Shad | 2,160,000 | 89,076,000 | | 92,236,000 |
| Whitefish | 55,428,000 | 195,964,000 | | 251,392,000 |
| Lake herring | 1,440,000 | 70,300,000 | | 71,740,000 |
| Silver salmon | 375,000 | 10,918,025 | | 11,293,025 |
| Chinook salmon | 37,531,417 | 16,342,556 | 67,525 | 53,941,498 |
| Blueback salmon | 100,000 | 121,136,995 | 21,719,600 | 142,956,595 |
| Steelhead trout | 250,000 | 3,570,287 | 179,718 | 3,900,005 |
| Humpback salmon | | 1,368,000 | | 1,368,000 |
| Rainbow trout | 536,494 | 552,716 | 1,771,128 | 2,860,338 |
| Atlantic salmon | 5,000 | 1,217,366 | 238,212 | 1,460,578 |
| Landlocked salmon | 115,000 | 985,040 | 304,364 | 1,404,404 |
| Blackspotted trout | 2,748,550 | 1,765,834 | 884,154 | 5,398,538 |
| Loch Leven trout | | | 68,248 | 68,248 |
| Lake trout | 10,210,000 | 33,649,622 | 4,286,150 | 48,145,772 |
| Brook trout | 516,000 | 7,405,545 | 4,228,461 | 12,150,006 |
| Sunapee trout | | 171,029 | | 171,029 |
| Grayling | 25,000 | 81,000 | 18 | 106,018 |
| Pike | | | 43,300 | 43,300 |
| Pickerel | | | 500 | 500 |
| Crappie and strawberry bass | | | 414,477 | 414,477 |
| Rock bass | | | 69,985 | 69,985 |
| Warmouth bass | | | 792 | 792 |
| Smallmouth black bass | | 537,600 | 113,305 | 650,905 |
| Largemouth black bass | | 56,600 | 679,482 | 736,082 |
| Sunfish (bream) | | | 345,635 | 345,635 |
| Pike perch | 321,455,000 | 155,025,000 | 4,760 | 476,484,760 |
| Yellow perch | 5,200,000 | 326,885,000 | 109,245 | 332,194,245 |
| Striped bass | 4,566,000 | 2,784,000 | | 7,350,000 |
| White bass | | | 6,050 | 6,050 |
| White perch | 16,500,000 | 338,480,000 | | 354,980,000 |
| Yellow bass | | | 250 | 250 |
| Sea bass | | 808,000 | | 808,000 |
| Smelt | 4,500,000 | | 9,000 | 4,509,000 |
| Mackerel | | 764,099 | | 764,000 |
| Freshwater drum | | | 11,950 | 11,950 |
| Cod | 9,854,000 | 210,354,000 | | 220,208,000 |
| Pollock | | 38,140,000 | | 38,140,000 |
| Haddock | | 712,000 | | 712,000 |
| Flatfish | | 930,755,000 | | 930,755,000 |
| Lobster | 780,000 | 162,505,000 | 2,052 | 163,287,052 |
| Total | 474,295,461 | 2,722,310,215 | 36,326,896 | 3,233,392,572 |

## REVIEW OF OPERATIONS.

The conspicuous increases in the output of fish and eggs over the year 1909 were in blueback, silver, and Atlantic salmons, lake trout, lake herring, yellow perch, shad, cod, flatfish, and steelhead trout, the production of the latter three species exceeding all previous records.

There was a slight decrease from last year in the number of chinook salmon liberated from the Pacific coast stations. Notwithstanding a normal run in the Sacramento, the season at the California stations was the poorest for thirteen years, due partly to such low water that the fish were unable to ascend the tributary streams on which the hatcheries are located, and, later, to freshets which carried away the racks and permitted the impounded fish to escape, with the loss of millions of eggs. Two causes are at present militating against the increase of salmon in these streams—the increasing numbers of black bass, which prey upon the young salmon after planting, and the

ascent of the fry by thousands into a recently constructed irrigating ditch, where they are left on the land to die. The only remedy that can be suggested is to plant the fry in the lower reaches of the rivers or establish a large hatchery at tide water, the latter method involving less expense. Unless some action is taken the number of salmon in these rivers will decline rapidly.

Taken as a whole, the work of the Oregon stations was satisfactory, although high water during the spawning of the chinook salmon shortened the season and reduced the collections to slightly below those of the previous year.

At the Washington stations, where attention is devoted chiefly to the sockeye, humpback, and silver salmons and the steelhead trout, the work was augmented by the opening of two new field stations. In Alaska, where the sockeye salmon is propagated, the yield of the two hatcheries was highly satisfactory, especially the Afognak station, operated for the first time this year.

The lake-trout, whitefish, and pike-perch work of the Great Lakes stations, while not equal to that of some seasons, gave better results than had been anticipated in view of the obstacles encountered. Potent factors in the shortage at the Michigan stations were the unusually early spawning season, followed by unfavorable weather, and the necessity of complying with recently enacted state legislation, which stipulates that the operations of the Bureau must be supervised by the state fish and game warden's department and that all eggs must be taken and fertilized by fishermen licensed by that department, thus placing the work in the hands of inexperienced men. Compliance with the provisions of this law curtailed the output of Northville and its substations fully one-fourth. The law also prohibited pike-perch collections on the St. Clair River, one of the Bureau's most productive fields in past years.

At the Duluth station the weather and other conditions were favorable, permitting increased lake-trout work, but whitefish and pike-perch operations on Lake Erie were materially interfered with by storms, although the poor collections of the latter species were offset to a great extent by the superior quality of the eggs secured.

The lobster output from the three marine stations was about equal to that of 1909. The impounded stock at the Boothbay Harbor station was stripped in April, and though the lobsters were in vigorous health the average yield of eggs was smaller than usual, due, it is believed, to their greater activity in the pound during the mild winter and the consequent shedding of many eggs. The construction of two substantial lobster pounds during the year places this station on a greatly improved basis. At the Gloucester and Woods Hole stations, which are not equipped with pounds, the lobsters collected during the fall are cared for in live cars through the winter.

The number of cod fry produced at these stations was nearly 100,000,000 greater than in 1909, the greatest gain being at the Gloucester station, where more eggs than could be handled were obtained from fishing grounds in the vicinity.

The collection of flatfish eggs was the largest ever made by the Bureau, numbering 1,195,911,000, from which 930,755,000 fry were hatched and distributed. At Boothbay Harbor, where this work has only recently been undertaken, the output was increased 100 per cent over that of the previous year.

Other marine species propagated included pollock at Gloucester, haddock at Boothbay Harbor, and mackerel and sea bass at Woods Hole.

In view of the steady decline in the shad fishery in rivers tributary to the Atlantic for the past fifteen years, it is gratifying to be able to record an increased egg collection of this species and a corresponding increase in the output of fry. The results are attributable partly to recently enacted legislation regulating the methods of fishing in the Albemarle Sound and partly to an exceedingly early spring, which started the run of fish in the Potomac River before the pound nets could be equipped, each factor permitting a larger number of fish than usual to ascend to the spawning grounds.

On the Susquehanna River, at one time the Bureau's most productive field, there was no improvement over recent years, emphasizing anew the destructive influences of unregulated fisheries and the necessity for concerted action by the States concerned if any practical results are to be obtained in the rehabilitation of this important fishery.

White and yellow perch were again produced in considerable numbers at the station on the Susquehanna River, and on the Potomac River the output of yellow perch exceeded all previous records, due to the enlargement of facilities for propagating the species.

Owing to the passage of a state law prohibiting the capture of striped bass by commercial fishermen during the spawning season, the Bureau was unable to secure eggs of this species at its California station in 1909, and as this law remains in force no attempt was made to conduct operations in 1910. The prospects are good for effective work with the striped bass in this field, and its propagation will be resumed in the event of a change in the law.

As in previous years, most of the brook-trout eggs handled at the fisheries stations are purchased from dealers, this course having proved more economical in most sections of the country than reliance upon collections from waters available for the purpose. At present only two stations—one in New England and one in Colorado—obtain their supplies of eggs from wild fish, and the fields heretofore

open to them are narrowing each year because of the encroachments of commercial fish culturists. In 1910 Wellington Lake and the Grand Mesa Lakes, heretofore the most productive sources of the Colorado station for eggs of the blackspotted, brook, and rainbow trout, had to be given up to private enterprise.

The Bureau having been requested to undertake the propagation of the blackspotted trout on the Truckee River with the view of replenishing the stock, depleted through excessive fishing, a field station was established at Derby Dam, Nevada, in the winter of 1909–10. In a normal season several millions of eggs might have been obtained, but owing to low water in the river and the destruction of large numbers of eggs by market fishermen the collections amounted to only 1,371,900. These were hatched without unusual losses and the fry deposited in the river. It seems advisable to continue operations here next season, as it is apparently a promising field for fish-cultural work.

Investigation of the streams in Yellowstone Park demonstrates the possibility of greatly extending operations with the black-spotted trout, and it is intended to increase the force of experienced men in this field with the view of making it a source of supply for the Leadville, Spearfish, and Bozeman stations. The work in the park during the past season was entirely satisfactory.

Taken as a whole, the output of the basses, sunfish, and catfish from stations in various parts of the country was good, the improved results being largely due to increased knowledge of the factors governing the successful propagation of these species. The production of pond stations was supplemented by the collections on the Mississippi and Illinois rivers, where, in addition to securing sufficient bass and allied species for restocking many depleted waters, large numbers of other fishes were seined from shallow sloughs formed by the floods and returned to the main streams. If not removed, the fish would perish from drought or cold, and their rescue conserves a valuable local food resource. A new station established at Helena, Ark., late in the summer rescued over half a million fish.

With the view of extending rescue operations over a larger territory, temporary collecting stations have been located at Caruthersville, Mo., and Rosedale, Miss., which will be made permanent auxiliary stations if experience proves favorable. It is believed that similar inexpensive stations can be advantageously established at various points on the Mississippi River from New Orleans to St. Paul, as the field for this work is extensive and the number of fish that can be economically reclaimed from the drying sloughs and lakes is governed only by the amount of money available for the purpose.

Although the propagation and general distribution of carp was discontinued many years ago, the Bureau constantly receives applica-

tions for this fish, and in instances where the waters described are unsuited to other species the requests are complied with by transferring carp from other waters. In this connection it may be interesting to quote from the census records that in 1903 the total catch of carp in the United States was 18,942,763 pounds, valued at $442,255, and in 1908 the total catch was 42,763,100 pounds, valued at $1,135,390.

### NEW STATIONS AND IMPROVEMENTS.

Under authority of the act providing for two or more new fish-cultural stations on Puget Sound or its tributaries, a careful investigation has been made and two suitable sites decided on. As soon as title can be obtained construction will begin.

At Holden, Vt., 24.3 acres of land were acquired for an auxiliary to the station at St. Johnsbury, the facilities of which were too limited for the requirements of northern New England.

The opportunities for fish-cultural and biological work in the valley of the upper Mississippi prompted Congress to authorize a station auxiliary to that at Fairport, Iowa, but to be more particularly devoted to propagation and the saving of fishes from overflowed lands. A site of about 31 acres was purchased at Homer, Minn., about 5 miles from Winona, and a pumping plant and ponds are now nearly completed and other buildings begun. The station will be ready for operation at an early date.

Results in the past having warranted the extension of the station at Mammoth Spring, Ark., 10.5 additional acres have been purchased there for the construction of several large ponds, which will soon be ready for use.

At the Fairport, Iowa, biological station much work in grading, construction of roads, and laying out ponds was done. A building 20 by 50 feet, with pebble-dash finish, containing an office, storage room, and small laboratory equipped for experimental work in fresh-water mussel culture, was practically completed during the year. A pumping plant consisting of two gasoline engines and two centrifugal pumps was installed in a small frame building 20 by 30 feet constructed for that purpose. Eleven cement ponds (4 small ones, 6 of medium size, and 1 large one) were also constructed for practical experiments in mussel propagation.

Improvements provided for by special appropriations were made at many of the stations. At Bozeman, Mont., cement hatching troughs were installed in place of wooden ones, in accordance with modern practice, and are giving excellent results. At Boothbay Harbor, Me., a coal house was built, the wharf extended and altered, and the dams at the lobster pound completed. At Erwin, Tenn., a new hatchery was built on modern plans, the old one hav-

ing become badly dilapidated and beyond repair. The new building is a frame structure 32 by 72 feet on a concrete foundation, and contains besides the hatching room, equipped with cement troughs, an office and workrooms. The water-supply and drainage systems have also been improved and extended, and to a considerable degree built in concrete. At Duluth, Minn., a dwelling for the superintendent has been erected which is in harmony with the surrounding private structures of the city and adds to the efficiency and appearance of the reservation. It is a two-story frame structure 32 by 36 feet, containing 7 rooms and basement, with the necessary office facilities. At Greenlake, Me., the new road has been completed, facilitating the distribution of fish and eggs, shortening materially the distance over which it is necessary to haul supplies, and doing away in great part with unreliable boat transportation. At Neosho, Mo., the new pipe line providing an extra supply of water has been completed and connected with the hatchery and ponds in approved manner, and the woodwork about the ponds has been replaced by concrete. It is believed there will be no further trouble with the water supply at this point for many years to come.

At Leadville, Afognak, Yes Bay, and the Pribilof Islands no expenditures of importance have been made for account of special appropriations.

The plans and specifications for the constructions described have been prepared in the office of the Bureau's architect and engineer and the work planned and supervised by him. In addition, various surveys have been made and plotted, and maps and charts of a special nature prepared.

For fish-cultural work on Lake Erie, in connection with the Put-in-Bay station and to take the place of a boat obsolete and worn out, there was built a steel steamboat of the lake tug type 85 feet long, 16 feet beam, and 8 feet 6 inches in depth. The vessel is equipped for the special requirements, has machinery and appliances of approved design, and it is expected will be a valuable addition to the facilities of the Bureau.

### ACCLIMATIZATION AND RESULTS OF FISH CULTURE.

After nearly forty years of endeavor to establish the chinook salmon of the Pacific coast in waters of the United States where it is not indigenous, conclusive evidence of success in one instance has come to hand. Within the past year it has been ascertained that the species has become established in Lake Sunapee, New Hampshire, where numerous specimens from 3 to 5 pounds in weight have been taken by anglers. This is undoubtedly the result of a plant made in 1904 by the New Hampshire fish commission, the eggs having been supplied from the Bureau's hatchery at Baird, Cal. Encouraged by the

outcome of this experiment, the Bureau made a plant of 40,000 fingerling chinook salmon in Lake Champlain in the spring of 1910.

There unquestionably has been an increase in Atlantic salmon in the Penobscot River, as evidenced by the results of the Bureau's operations in 1910 compared with 1908 and 1909. Though receiving the catch of a smaller number of weirs the past season, the collection of spawning fish was twice as great as in 1909 and 60 per cent greater than in 1908.

It is believed that owing to the planting of the species by the Bureau pike perch have become sufficiently abundant in the St. Lawrence River to warrant the collection of eggs at the Cape Vincent station, and plans will be made accordingly. The fishermen on Lake Ontario report that lake trout and whitefish, which have been planted extensively by the Bureau, are increasing rapidly, and that numbers of fishermen who were driven to other pursuits by the former depletion of the fishery are resuming operations. In 1908 the catch of these two species was 5,567 pounds, while in 1909 it increased to 12,532 pounds. A corresponding increase is shown in the take of pike perch in this lake.

The following statistics show the increasing catch of the striped-bass fishery in California, the species having first been introduced from the Atlantic coast into the waters of that State in 1879:

| Year. | Pounds. | Value. | Year. | Pounds. | Value. |
|---|---|---|---|---|---|
| 1889 | 16,296 | $4,073 | 1893 | 252,454 | $13,037 |
| 1890 | 20,119 | 4,021 | 1899 | 1,234,320 | 61,814 |
| 1891 | 30,674 | 4,602 | 1904 | 1,570,404 | 92,116 |
| 1892 | 56,209 | 6,488 | 1908 | 1,775,700 | 134,660 |

For a series of years it has been the custom at the Baird, Cal., station to select for spawning purposes large fish only, a practice which appears to be developing a larger breed of fish. Chinook salmon of the run of 1909 averaged 20 pounds in weight, an increase of about 3 pounds over the previous run. The possibilities of selective breeding are indicated by this experience.

### FISH-CULTURAL RELATIONS WITH STATES AND FOREIGN COUNTRIES.

Several States still continue in force certain laws and regulations in respect to the fisheries which tend to curtail and hamper the activities of the Bureau. In some cases the States show a willingness to mitigate as far as possible the effects of laws which inadvertently interfere with the Bureau's work, but in one or two instances the legislative and executive attitude appears to be unreasonable if not hostile.

With the States in general the relations of the Bureau have always been harmonious, and a system of cooperation has developed which

has been mutually beneficial to the participants and advantageous to the public. Eggs taken and fertilized at the Bureau's stations are transferred to the state fish commissions, by which they are hatched and planted. The Bureau's expenses and difficulties in distribution are thereby reduced and simplified, and the superior local knowledge usually at the service of the state authorities is of value in indicating the most suitable localities in which to plant the fry. On Lake Erie the Ohio and Pennsylvania fishery authorities cooperated with the Bureau in the collection of eggs of the whitefish, lake cisco, and pike perch.

As shown in the following table, the fish eggs allotted to the state commissions during 1910 aggregated over 443,000,000 and were sent into 17 States:

ALLOTMENT OF FISH EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR ENDED JUNE 30, 1910.[a]

| State and species. | Eggs. | State and species. | Eggs. |
|---|---|---|---|
| California: | | New York: | |
| Chinook salmon | 28,764,467 | Blackspotted trout | 50,000 |
| Colorado: | | Rainbow trout | 41,500 |
| Blackspotted trout | 225,000 | Landlocked salmon | 15,000 |
| Connecticut: | | White perch | 15,000,000 |
| Yellow perch | 5,200,000 | North Dakota: | |
| Illinois: | | Steelhead trout | 100,000 |
| Lake trout | 500,000 | Pike perch | 10,000,000 |
| Whitefish | 4,000,000 | Ohio: | |
| Pike perch | 8,000,000 | Whitefish | 18,000,000 |
| Rainbow trout | 41,264 | Pike perch | 170,725,000 |
| Michigan: | | Oregon: | |
| Landlocked salmon | 20,000 | Chinook salmon | 6,465,300 |
| Lake trout | 5,000,000 | Blackspotted trout | 175,000 |
| Pike perch | 34,280,000 | Pennsylvania: | |
| Missouri: | | Silver salmon | 75,000 |
| Brook trout | 100,000 | Blackspotted trout | 50,000 |
| Rainbow trout | 25,000 | Whitefish | 31,428,000 |
| Pike perch | 2,000,000 | Pike perch | 96,000,000 |
| Montana: | | Washington: | |
| Blackspotted trout | 550,000 | Steelhead trout | 50,000 |
| Whitefish | 500,000 | Brook trout | 100,000 |
| Nevada: | | Wisconsin: | |
| Blackspotted trout | 422,000 | Lake trout | 4,500,000 |
| New Hampshire: | | Wyoming: | |
| Chinook salmon | 100,000 | Blackspotted trout | 675,000 |
| | | Total | 443,177,531 |

[a] Also there were allotted to Michigan 3,500 lake trout, to Oregon 45 blackspotted trout, and to Wisconsin 3,880 lake trout, or a total of 7,425 fingerlings, yearlings, and adults.

In response to requests coming through diplomatic channels the Bureau furnished eggs to the governments of foreign countries as follows:

| Country and species. | Eggs. | Country and species. | Eggs. |
|---|---|---|---|
| Argentina: | | France: | |
| Chinook salmon | 200,000 | Blackspotted trout | 10,000 |
| Silver salmon | 100,000 | Japan: | |
| Sockeye salmon | 100,000 | Rainbow trout | 110,000 |
| Landlocked salmon | 25,000 | Brook trout | 5,000 |
| Lake trout | 50,000 | | |
| | | Total | 600,000 |

## BIOLOGICAL INQUIRIES AND EXPERIMENTS.

### OYSTER INVESTIGATIONS AND SURVEYS.

The field work of the survey of the public oyster beds of James River, Virginia, which was undertaken at the request of the governor and the fish commissioner of Virginia, was brought to a conclusion on September 15, the charts and report were finished on November 30, and the printed report was issued about February 1. This survey was designed to furnish definite data concerning the location, extent, and condition of the public grounds in the James and Nansemond rivers above Newport News and to provide a foundation for needed legislation by the State. The present boundary lines are based on the survey of 1892–1894, and their justice has long been a matter of contention, the oystermen claiming that much productive bottom was omitted from the public grounds, and the planters contending that a large area of barren bottom was included. The present survey could not demonstrate the validity of the first claim, as such bottoms, if they existed, have been long since occupied for planting purposes, but it was shown that about 58 per cent of the present area of the grounds consists of barren bottom and an additional 15 per cent bears oysters too sparsely scattered to be commercially valuable. Of the 26,408.4 acres surveyed, but 7,153 acres can be regarded as actually productive. It was found also that in certain places oyster planters have encroached on the public rocks, and it was evident that in other places adjoining the planted beds the rocks had been depleted by illicit operations.

To release from the public grounds and throw open to rental a considerable area of the barren bottom and to rectify the boundary lines so as to permit adequate policing, the state fish commissioner had an enabling act introduced in the legislature at its latest session. To attain the ends sought, it unfortunately was necessary to exclude from the public grounds a small proportion of the productive bottom, and as the legislature held that this was in contravention of a constitutional provision relating to the oyster beds, the proposed law failed of passage.

At the request of the governor of Delaware, acting in his capacity as chairman of the Delaware Oyster Survey Commission, the Bureau, at the close of the fiscal year, was engaged in a survey of the natural oyster beds of Delaware, the State defraying part of the expenses for necessary temporary assistance. As in the case of the James River survey, the steamer *Fish Hawk* was detailed for the service, and a considerable part of the work was performed by her personnel.

The authorities of Alabama and Mississippi have also requested assistance and advice in connection with the management of oyster

has been mutually beneficial to the participants and advantageous to the public. Eggs taken and fertilized at the Bureau's stations are transferred to the state fish commissions, by which they are hatched and planted. The Bureau's expenses and difficulties in distribution are thereby reduced and simplified, and the superior local knowledge usually at the service of the state authorities is of value in indicating the most suitable localities in which to plant the fry. On Lake Erie the Ohio and Pennsylvania fishery authorities cooperated with the Bureau in the collection of eggs of the whitefish, lake cisco, and pike perch.

As shown in the following table, the fish eggs allotted to the state commissions during 1910 aggregated over 443,000,000 and were sent into 17 States:

ALLOTMENT OF FISH EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR ENDED JUNE 30, 1910.[a]

| State and species. | Eggs. | State and species. | Eggs. |
|---|---|---|---|
| California: | | New York: | |
| Chinook salmon | 28,764,467 | Blackspotted trout | 50,000 |
| Colorado: | | Rainbow trout | 41,500 |
| Blackspotted trout | 225,000 | Landlocked salmon | 15,000 |
| Connecticut: | | White perch | 15,000,000 |
| Yellow perch | 5,200,000 | North Dakota: | |
| Illinois: | | Steelhead trout | 100,000 |
| Lake trout | 500,000 | Pike perch | 10,000,000 |
| Whitefish | 4,000,000 | Ohio: | |
| Pike perch | 8,000,000 | Whitefish | 18,000,000 |
| Rainbow trout | 41,264 | Pike perch | 170,725,000 |
| Michigan: | | Oregon: | |
| Landlocked salmon | 20,000 | Chinook salmon | 6,465,300 |
| Lake trout | 5,000,000 | Blackspotted trout | 175,000 |
| Pike perch | 34,280,000 | Pennsylvania: | |
| Missouri: | | Silver salmon | 75,000 |
| Brook trout | 100,000 | Blackspotted trout | 50,000 |
| Rainbow trout | 25,000 | Whitefish | 31,428,000 |
| Pike perch | 2,000,000 | Pike perch | 96,000,000 |
| Montana: | | Washington: | |
| Blackspotted trout | 550,000 | Steelhead trout | 50,000 |
| Whitefish | 500,000 | Brook trout | 100,000 |
| Nevada: | | Wisconsin: | |
| Blackspotted trout | 422,000 | Lake trout | 4,500,000 |
| New Hampshire: | | Wyoming: | |
| Chinook salmon | 100,000 | Blackspotted trout | 675,000 |
| | | Total | 443,177,531 |

[a] Also there were allotted to Michigan 3,500 lake trout, to Oregon 45 blackspotted trout, and to Wisconsin 3,880 lake trout, or a total of 7,425 fingerlings, yearlings, and adults.

In response to requests coming through diplomatic channels the Bureau furnished eggs to the governments of foreign countries as follows:

| Country and species. | Eggs. | Country and species. | Eggs. |
|---|---|---|---|
| Argentina: | | France: | |
| Chinook salmon | 200,000 | Blackspotted trout | 10,000 |
| Silver salmon | 100,000 | Japan: | |
| Sockeye salmon | 100,000 | Rainbow trout | 110,000 |
| Landlocked salmon | 25,000 | Brook trout | 5,000 |
| Lake trout | 50,000 | | |
| | | Total | 600,000 |

the Mississippi Valley, but particularly for the cultivation of the mussels employed as raw material in the pearl-button industry, a manufacturing interest giving employment to a large number of persons.

Progress has also been made in the construction of the substation at Homer, Minn., which recent investigations show can be employed for various economic purposes connected with the fisheries, in addition to mussel culture.

### EXPERIMENTS IN SPONGE CULTURE.

Although the experiments in growing sponges from artificial cuttings have already developed what the Bureau regards as a practical system of sponge culture, work is still being carried on with the purpose of improving the methods and testing the effects of different environments on the rate and character of sponge growth.

The sponges grown in Cape Florida Channel, which, as reported last year, attained an average weight of 1.25 ounces each at the end of twenty-nine months, were found to average 2 ounces ten months later, some of the largest specimens weighing from 3 to 6 ounces each when thoroughly cleaned and dry. The same disparity in the rate of growth of different specimens observed in other localities was found to occur in this place, while at Soldier Key, about 7 miles distant, where the conditions appear to be equally favorable, growth was very slow.

### STUDY OF FISH DISEASES.

During the fiscal year the Bureau has continued cooperation with the New York State Cancer Laboratory in the investigation of thyroid tumor or cancer in domesticated fishes. An aquarium with two independent systems of closed-water circulation, with proper means of refrigeration, has been established for the observation of salmon and trout and experiments in inoculation and treatment. Investigation at various stations of the Bureau and at other hatcheries have shown that the disease is even more widespread and general than was suspected. Considerable difficulty has been encountered in obtaining for purposes of experiment a sufficient number of fish above suspicion of infection, and it has been necessary in this effort to secure a quantity of wild trout from remote streams. Owing to the technical difficulties attending this work, which are equal to those retarding the advance of knowledge relating to the cause and nature of cancer in human beings, progress is made only by slow and painstaking steps and by the use of the most approved appliances and methods. For this reason it is highly important that the Bureau should be provided with a well-equipped laboratory

and experimental hatchery, not only for the purposes of the present investigation but for the study of the many other diseases affecting fishes, both under domestication and in a state of nature. The President, in a special message to Congress dated April 9, 1910, urgently recommended an appropriation for this purpose.

During the year the Bureau was called on to investigate epidemics among hatchery fish at Spruce Creek, Pa., and Roxbury, Vt. At the former place the mortality was due in part to the thyroid tumor or cancer before alluded to, but the majority of the deaths were apparently caused by a bacterial infection which the Bureau has found at other places, but which it has not the facilities to study at present. At Roxbury the disease is also infectious and annually causes large losses. The Bureau has likewise made investigations in Pennsylvania, Ohio, and West Virginia upon the kindred subject of the pollution of streams in its relation to fishes and the fisheries.

### OTHER INQUIRIES AND EXPERIMENTS.

The investigations of the Pacific coast salmons have materially advanced knowledge of the subjects during the year, particularly in respect to parasitism and the changes in the tissues affecting the food value of the fish at and near the breeding season, and in regard to the relationship of the steelhead trout and rainbow trout.

In connection with the State Geological and Natural History Survey, the Bureau has continued examination of lakes in Wisconsin, with particular regard to the gaseous content of their waters. The relationship of this subject to practical fish culture is highly important, and the data so far obtained have thrown light on certain failures in the acclimatization of fishes, the causes of which have been obscure. The study of the physical environment and habits of the salmon, smelt, and other fishes of Sebago Lake, Maine, were continued, and in response to a request a somewhat similar line of research was undertaken in Sunapee Lake, New Hampshire. In the latter locality there is a considerable fishery for smelts as they ascend the streams to spawn, and it was learned that young chinook salmon planted in the brooks were taken with the smelts.

The survey of the fishing grounds and investigation of the aquatic resources of the Philippine Islands, in which the steamer *Albatross* has been employed since the autumn of 1907, was brought to a conclusion in October, 1909. The vessel returned to San Francisco on May 4, 1910. The Philippine expedition has yielded extensive collections and a large amount of information relating to the fisheries and fishery resources, and the material is now in course of study for the preparation of comprehensive reports on the scientific and economic results.

### MARINE BIOLOGICAL LABORATORIES.

The marine biological laboratories maintained by the Bureau at Woods Hole, Mass., and Beaufort, N. C., were open as usual for several months during the summer and fall, and their facilities were availed of by the usual number of investigators. The researches carried on covered a considerable range of subjects and embraced investigations of a number of species of economic importance, including the diamond-back terrapin, fishes, stone crab, quahog or hard clam, oysters, mussels, and seaweeds. The year witnessed the completion of an elaborate report by the director of Woods Hole laboratory on the marine biology of the waters adjacent to the station, embodying the results of investigations carried on for many years.

### ALASKA SALMON SERVICE.

The report of the agents at the salmon fisheries of Alaska, which was published in April, 1910, includes the data for the fishing season of 1909, practically all of which was embraced in the fiscal year 1910.

The number of salmon taken during the season was about equal to the catch of 1907, but fully 20 per cent less than the number caught in 1908. In 1909 there were taken 34,692,608 fish of a gross weight of 175,028,594 pounds, as compared with 43,304,979 fish weighing 213,378,570 pounds caught in 1908. The decrease was apparent in all species excepting the king salmon, which exhibited an increase of about 55 per cent. The catch of red salmon was 115,120,670 pounds, as compared with 124,713,630 pounds in 1908; of humpbacks, 37,965,928 pounds, as compared with 60,424,620 pounds; of dog salmon, 9,456,048 pounds, as compared with 18,066,576 pounds; of king salmon, 8,959,544 pounds, as compared with 5,757,246 pounds; and of cohos, 3,526,404 pounds, as compared with 4,416,498 pounds.

The total pack of canned salmon in 1909 was 2,403,669 cases, valued at $9,439,152. There were 45 canneries in operation, a decrease of 5 since 1908, and the total investment in the industry, excluding cash capital, was $8,631,345. In addition to the canned pack, the fishery produced pickled salmon to the value of $208,758, mild-cured salmon valued at $149,300, and some minor products.

The total yield of the salmon industry was valued at $9,796,210, produced by an investment of $9,007,037 and the labor of 11,439 persons.

Owing to the vigilant enforcement of the laws by the agents of the Bureau during the preceding year, there were comparatively few complaints of violations during 1909. Several convictions were obtained for fishing during the weekly close season, but those engaged in the fishery showed a general desire to comply with the laws and the regulations of the Department. The pernicious practice of

"jigging" for salmon, which results in the cruel mutilation of fish which afterwards escape and die, has been stopped, and prohibition has been placed on the tourists' practice of catching in their hands the nutritively useless but reproductively valuable spawning fish struggling up the falls and rapids.

The effort to prevent the waste of edible portions of salmons, the choice parts of which have been pickled under former practices, has been successful, the salteries now pickling the entire fish or utilizing in other ways the edible parts formerly thrown away.

The statistics relating to the operations of the government and private fish hatcheries in Alaska will not be available until the return of the agents from the Territory.

The counting of the salmon passing into Wood River, which was begun in the preceding year, was continued during the run of 1909. The spawning fish numbered but 893,000, as compared with 2,600,000 in 1908, and the catch of fish in Nushagak Bay, to which Wood River is a tributary, was but 4,900,000, as compared with 6,400,000 in the year before. It is estimated that between 6,200,000 and 7,400,000 fish entered the Nushagak basin, and that between 20 and 35 per cent escaped to the spawning grounds, as compared with a total run of between 10,100,000 and 13,600,000 fish and an escape of between 37 and 53 per cent in 1908. From the valuable but still insufficient data so far obtained it appears that for every salmon reaching the spawning grounds from two to five return several years later, and that of these from one to four may be taken without impairing the fishery. These are highly probable extremes, and the present rate of reproductive increase is between the two.

In the minor fisheries of Alaska cod were taken to the value of $118,821 and halibut worth $195,529. There were employed in these fisheries fixed capital to the value of $503,837 and 548 persons. In addition there is a fleet of vessels from California and Washington fishing in Alaskan waters, the data for which are not included in the above.

The Bureau is making an effort to stop the use of food fishes for fertilizer and to stimulate the utilization of scraps and waste fishes for that purpose. This is not only in the interest of economy of consumption, but to prevent the pollution of waters through the discharge of putrescent wastes. It therefore recommends the enactment of laws prohibiting the manufacture of fertilizer from food fishes and the extension of the antipollution act of March 3, 1899, in such manner as to protect the fisheries of Alaska.

Suitable vessels for the use of the salmon-inspection service are urgently required, and provision should be made by law for the regulation and limitation of the future establishment of plants for utilizing salmon.

Attention is again called to the fact that the personnel of the Alaska salmon service is entirely inadequate to a proper enforcement of the laws and regulations and the carrying on of investigations essential to a proper and intelligent administration of these important fisheries. Several additional scientific assistants are urgently needed in this service.

## ALASKA FUR-SEAL SERVICE.

By an act of Congress approved April 21, 1910, that portion of the previous law requiring the Secretary of Commerce and Labor to lease the privilege of killing seals on the Pribilof Islands was repealed, and as the lease of the North American Commercial Company expired by limitation on April 30, 1910, the Bureau, under the direction of the Secretary of Commerce and Labor, assumed the entire administration of the islands, including the functions and obligations previously imposed on the lessees. The present duties of the Bureau on the islands therefore embrace all matters whatsoever relating to the seal herd and the care, education, and welfare of the native population.

Owing to the abuses connected with pelagic sealing mentioned in the preceding report of the Bureau, the condition of the seal herd is more precarious than at any previous period of its known history, and the utmost care must be exercised to save it from commercial extinction. In anticipation of the expiration of the lease recently in force and in view of the advisability of a change in the methods of administering the islands, the Bureau called a meeting of the advisory board mentioned in the last report, which, together with the employees of the Bureau, embraces practically all of the available naturalists and officials whose experience on the islands qualifies them to pass in judgment upon the present requirements of the seal herd. The Bureau has based its policy in respect to the islands upon the unanimous advice and recommendations of the parties to this conference.

The preponderance of the pelagic kill on the high seas, which is beyond the Bureau's control, consists of mature cow seals, and for reasons that are recognized by those having knowledge of the habits of the fur seal the killing of a limited number of the excess of immature males has been deemed advisable. No definite quota has been fixed, but the number is to be determined by the agents on the islands governed by certain rigid limitations as to age, sex, size, and the minimum number to be reserved for future breeding. The breeding reserve is to be selected, as far as possible, from the most vigorous and perfect individuals, with a view to the gradual improvement of the herd.

Under the provisions of the act of April 21, 1910, the Secretary of Commerce and Labor is charged with all matters pertaining to the care and preservation of all the fur-bearing animals of Alaska. Under this authority the Bureau has drawn regulations relating to the killing or capture in Alaska of certain fur-bearing animals other than seals, and said regulations, having been signed and promulgated by the Secretary of Commerce and Labor, are now effective in the Territory.

For the purpose of putting into effect the provisions of the act above referred to, the sum of $150,000 was appropriated. The immediately necessary additional employees required by the enlargement of the Bureau's functions on the islands have been appointed. The Bureau, under authority of the law and by direction of the Secretary of Commerce and Labor, has entered into negotiations for the purchase of the buildings, boats, and other property of the North American Commercial Company on the islands. The company has placed an apparently reasonable valuation on its property, and the proposition is under consideration subject to the results of an inventory now being made by an agent of the Bureau on the islands.

The data relating to the killing and the condition of the seal herds to July 31, 1909, were published in the preceding report of the Bureau. Those for the season of 1910 are not available at the time of writing the present report, and in any event are more strictly germane to the succeeding fiscal year.

## THE FISHERY INDUSTRIES.

### STATISTICS AND METHODS OF THE FISHERIES.

The commercial fisheries of the United States, including the various fishery industries dependent upon them, represent an investment of about $95,000,000, and the value of the products derived from the fisheries proper is about $62,000,000. With the exception of the mackerel and some other fisheries that for a number of years have not been as extensive as formerly, all of the more important branches of the industry are in a prosperous condition. The catch of mackerel during the past year was smaller than in the previous year, amounting to 46,439 barrels fresh and 17,542 barrels salted in 1909, against 57,566 barrels fresh and 21,267 barrels salted in 1908. The spring fishery in 1910 was poorer than for a number of years past, the catch up to July 1 being only 16,410 barrels of fresh mackerel and only 2,490 barrels of salted mackerel. It was an exceptionally unfavorable season for the seiners, as they took only about 2,200 barrels of the total catch of fresh mackerel, the remainder being caught by the gill-net fishermen. The fish were larger than usual, many of them weighing from 3 to 4 pounds each, but the greater portion from 2 to 3 pounds each. The fleet numbered about 50 seiners and 125 netters.

Prices were good and some of the netters made large stocks. The first mackerel of the season were landed on April 8, at Fort Monroe, Va., the fare consisting of 1,200 fish weighing 2½ pounds each. The seiners reported seeing a good body of fish off the southern coast, but they were wild and could not be caught with seines. Of the fresh mackerel landed, 1,000 barrels were caught on Nantucket Shoals and the remainder mostly off the coast of New Jersey and in the vicinity of Block Island. The salted mackerel were all from the Cape Shore, and were all large fish. The light catch so far during the season on the Cape Shore is attributed to the fact that the fish passed along the coast far offshore outside of the fleet.

The investigation of the fisheries of the Philippine Islands was completed before the close of the year, and the statistics and other information relating to the commercial fisheries are being compiled.

A canvass of the salmon fisheries of the Pacific coast has also been made and the returns will be published at an early date.

In the spring of 1910 a beginning was made in the collection of comprehensive statistics of the oyster fishery. This is the greatest single national fishery in the world, and of itself yields a more valuable product than that derived from the entire fisheries of many important maritime countries. The work is demanded in the interests of the trade and for enlightened legislative regulation of the fishery. A canvass of the shad fisheries of the South Atlantic States was begun at the same time, and both inquiries were in progress at the close of the year.

The usual information was collected by the local agents at Boston and Gloucester, Mass., as to the quantity and value of fishery products landed at those ports by American fishing vessels during the year. The investigation of the movements of mackerel was concluded, and an inquiry was made regarding the condition of the shad and alewife fisheries of Chesapeake Bay and tributaries, and the fisheries of Mississippi.

The statistics collected by the local agents at Boston and Gloucester, Mass., of the extensive vessel fisheries at those ports have been published as monthly bulletins and distributed to the trade in various parts of the country, and also as annual bulletins giving the quantity and value of fishery products landed by American fishing vessels by months and by fishing grounds for the calendar year. The number of trips landed at these ports in 1909 was 6,306, aggregating 173,102,224 pounds of fish, valued at $1,616,444. Compared with the previous year the receipts have decreased 8,363,023 pounds in quantity and $12,981 in value. There was a decrease in the catch of cusk, hake, and mackerel, but an increase in that of cod, pollock, and halibut. The statistics are given in detail on the following pages.

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING 1909, BY MONTHS.

| Month. | No. of trips. | Cod. | | | | Cusk. | | | | Haddock. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Fresh. | | Salted. | | Fresh. | | Salted. | | Fresh. | | Salted. | |
| LANDED AT BOSTON. | | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* |
| January | 287 | 1,211,700 | $31,170 | | | 121,900 | $2,265 | | | 3,394,600 | $84,561 | | |
| February | 366 | 1,373,600 | 50,569 | | | 166,700 | 3,766 | | | 4,801,100 | 127,821 | | |
| March | 527 | 2,408,300 | 70,673 | | | 165,700 | 2,749 | | | 5,210,500 | 132,470 | | |
| April | 518 | 1,089,700 | 47,942 | | | 289,000 | 4,288 | | | 4,043,800 | 91,698 | | |
| May | 357 | 1,984,400 | 44,892 | | | 310,000 | 3,609 | | | 1,715,600 | 44,588 | | |
| June | 305 | 2,696,800 | 75,588 | | | 90,500 | 1,398 | | | 2,284,100 | 45,460 | | |
| July | 397 | 3,082,600 | 76,982 | | | 67,500 | 1,143 | | | 2,388,200 | 42,791 | | |
| August | 352 | 2,931,800 | 75,275 | | | 43,700 | 769 | | | 2,040,800 | 68,714 | | |
| September | 330 | 2,823,800 | 76,922 | | | 144,500 | 2,573 | | | 3,800,450 | 66,096 | | |
| October | 464 | 2,440,900 | 79,378 | | | 195,000 | 2,941 | | | 3,584,600 | 96,513 | | |
| November | 475 | 1,931,850 | 62,177 | | | 134,700 | 2,038 | | | 2,295,100 | 80,795 | | |
| December | 410 | 1,245,250 | 50,010 | | | 233,500 | 3,982 | | | 2,306,400 | 85,237 | | |
| Total | 4,798 | 25,849,700 | 749,578 | | | 1,902,700 | 31,521 | | | 38,485,250 | 966,744 | | |
| LANDED AT GLOUCESTER. | | | | | | | | | | | | | |
| January | 77 | 357,373 | 5,982 | 247,641 | $9,137 | 30,395 | 478 | 1,950 | $49 | 327,680 | 6,120 | 6,957 | $104 |
| February | 43 | 151,311 | 3,464 | 78,212 | 2,695 | 53,170 | 850 | 2,510 | 63 | 571,686 | 11,626 | 2,537 | 30 |
| March | 76 | 782,729 | 13,131 | 199,327 | 6,823 | 21,510 | 327 | 1,554 | 39 | 553,864 | 8,342 | 4,885 | 49 |
| April | 65 | 383,267 | 5,827 | 149,989 | 4,970 | 245,390 | 3,682 | 1,525 | 36 | 624,560 | 3,748 | 925 | 9 |
| May | 121 | 164,685 | 2,461 | 915,051 | 27,800 | 185,236 | 2,779 | 3,657 | 86 | 19,460 | 118 | 29,435 | 295 |
| June | 202 | 783,700 | 17,569 | 3,685,317 | 104,748 | 131,585 | 1,973 | 22,915 | 572 | 159,073 | 955 | 84,484 | 845 |
| July | 202 | 1,128,505 | 20,020 | 4,405,725 | 132,929 | 227,736 | 3,611 | 47,600 | 1,194 | 468,668 | 2,810 | 114,019 | 1,142 |
| August | 143 | 1,727,503 | 29,753 | 5,388,393 | 168,699 | 86,743 | 1,413 | 22,143 | 554 | 203,350 | 1,320 | 75,926 | 760 |
| September | 147 | 3,117,323 | 50,052 | 5,803,660 | 179,781 | 83,990 | 1,348 | 39,467 | 988 | 227,540 | 2,078 | 47,919 | 478 |
| October | 153 | 2,781,693 | 42,899 | 5,782,798 | 177,431 | 29,942 | 479 | 15,112 | 379 | 284,185 | 4,273 | 41,668 | 418 |
| November | 197 | 1,284,533 | 20,049 | 5,119,912 | 156,920 | 78,359 | 1,258 | 19,217 | 480 | 172,815 | 5,348 | 11,633 | 116 |
| December | 82 | 86,719 | 2,371 | 968,356 | 31,720 | 11,182 | 172 | 7,885 | 197 | 302,635 | 9,537 | 4,215 | 43 |
| Total | 1,508 | 12,749,431 | 213,569 | 32,744,372 | 1,003,653 | 1,185,238 | 18,370 | 185,535 | 4,637 | 3,915,516 | 56,275 | 424,603 | 4,289 |
| Grand total | 6,306 | 38,590,131 | 955,147 | 32,744,372 | 1,003,653 | 3,147,938 | 49,891 | 185,535 | 4,637 | 42,400,766 | 1,023,019 | 424,603 | 4,289 |
| Grounds E. of 66° W. long. | 752 | 10,555,761 | 189,094 | 28,586,245 | 866,533 | 532,702 | 8,770 | 79,908 | 2,000 | 5,055,721 | 115,054 | 238,175 | 2,404 |
| Grounds W. of 66° W. long. | 5,554 | 28,034,370 | 765,453 | 4,158,127 | 137,120 | 2,615,236 | 41,121 | 105,627 | 2,637 | 37,345,145 | 907,965 | 186,428 | 1,885 |
| Landed at Boston in 1908 | 1,542 | 28,329,200 | 791,821 | | | 1,609,100 | 32,204 | | | 39,814,500 | 1,027,866 | | |
| Landed at Gloucester in 1908 | 2,067 | 13,286,077 | 250,862 | 21,832,454 | 762,801 | 3,457,399 | 56,522 | 140,772 | 3,531 | 7,603,365 | 89,466 | 640,507 | 9,729 |

| Month. | Hake. | | | | Pollock. | | | | Halibut. | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fresh. | | Salted. | | Fresh. | | Salted. | | Fresh. | | Salted. | |
| LANDED AT BOSTON. | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* |
| January | 376,000 | $7,611 | | | 183,700 | $4,450 | | | 69,500 | $7,220 | | |
| February | 362,100 | 13,181 | | | 172,600 | 6,183 | | | 74,200 | 6,435 | | |
| March | 393,500 | 10,300 | | | 264,000 | 7,933 | | | 180,200 | 12,899 | | |
| April | 508,100 | 10,620 | | | 273,200 | 4,926 | | | 117,300 | 7,976 | | |
| May | 1,049,800 | 13,755 | | | 276,900 | 3,770 | | | 163,300 | 11,325 | | |
| June | 875,400 | 9,013 | | | 293,600 | 3,379 | | | 215,900 | 11,988 | | |
| July | 777,600 | 10,854 | | | 663,000 | 8,293 | | | 141,900 | 9,222 | | |
| August | 715,100 | 12,028 | | | 821,500 | 13,252 | | | 27,800 | 2,280 | | |
| September | 1,076,700 | 15,936 | | | 845,300 | 14,495 | | | 138,100 | 12,597 | | |
| October | 2,536,900 | 28,967 | | | 1,767,700 | 16,926 | | | 21,650 | 2,887 | | |
| November | 1,965,900 | 26,343 | | | 1,402,950 | 14,511 | | | 40,400 | 4,577 | | |
| December | 832,300 | 23,445 | | | 1,004,400 | 20,633 | | | 14,700 | 2,772 | | |
| Total | 11,469,400 | 182,053 | | | 7,968,850 | 118,751 | | | 1,204,950 | 92,178 | | |
| LANDED AT GLOUCESTER. | | | | | | | | | | | | |
| January | 10,585 | 89 | 4,747 | $72 | 22,820 | 196 | 43,860 | $659 | 158,316 | 15,798 | 4,685 | $328 |
| February | 19,448 | 223 | 625 | 8 | 11,820 | 168 | 8,726 | 106 | 246,827 | 24,545 | 510 | 36 |
| March | 1,190 | 9 | 820 | 10 | 12,546 | 117 | 3,882 | 39 | 306,329 | 24,724 | 5,115 | 345 |
| April | 49,836 | 300 | 6,910 | 69 | 45,028 | 317 | 3,592 | 36 | 395,156 | 26,161 | 9,759 | 652 |
| May | 299,267 | 1,796 | 665 | 7 | 1,125,580 | 7,426 | 69,570 | 696 | 412,121 | 20,304 | | |
| June | 359,649 | 2,158 | 5,760 | 58 | 933,193 | 5,598 | 116,755 | 1,169 | 261,205 | 14,462 | 21,301 | 1,067 |
| July | 314,998 | 1,892 | 10,305 | 113 | 344,258 | 2,069 | 484,614 | 6,342 | 248,464 | 16,652 | 34,436 | 1,921 |
| August | 60,432 | 392 | 10,282 | 103 | 58,504 | 351 | 147,941 | 1,478 | 135,807 | 11,098 | 22,159 | 1,326 |
| September | 72,425 | 511 | 38,594 | 386 | 102,070 | 844 | 154,039 | 1,537 | 72,799 | 6,735 | 575,421 | 45,887 |
| October | 272,656 | 2,151 | 7,026 | 71 | 355,647 | 2,061 | 155,166 | 1,552 | 62,448 | 7,366 | 175,715 | 14,066 |
| November | 218,348 | 1,967 | 24,605 | 246 | 1,459,862 | 8,088 | 96,955 | 971 | 59,519 | 6,932 | 9,394 | 713 |
| December | 15,007 | 277 | 2,985 | 30 | 63,013 | 1,077 | 95,545 | 956 | 24,664 | 3,051 | 1,618 | 130 |
| Total | 1,693,841 | 11,765 | 113,324 | 1,173 | 4,533,741 | 28,312 | 1,380,645 | 15,541 | 2,383,685 | 177,828 | 860,113 | 66,471 |
| Grand total | 13,163,241 | 193,818 | 113,324 | 1,173 | 12,502,591 | 147,063 | 1,380,645 | 15,541 | 3,588,635 | 270,006 | 860,113 | 66,471 |
| Grounds E. of 66° W. long | 456,978 | 7,415 | 88,148 | 921 | 147,182 | 1,951 | 1,006,776 | 11,736 | 3,169,944 | 231,476 | 855,653 | 66,163 |
| Grounds W. of 66° W. long | 12,706,263 | 186,403 | 25,176 | 252 | 12,355,409 | 145,112 | 373,869 | 3,805 | 418,691 | 38,530 | 4,460 | 308 |
| Landed at Boston in 1908 | 12,466,100 | 214,780 | | | 6,286,800 | 87,568 | | | 303,450 | 26,677 | | |
| Landed at Gloucester in 1908 | 7,968,350 | 64,522 | 122,442 | 1,833 | 6,141,926 | 47,600 | 1,090,205 | 16,364 | 2,875,802 | 205,957 | 946,558 | 66,263 |

QUANTITIES AND VALUES OF CERTAIN FISHERY PRODUCTS LANDED AT BOSTON AND GLOUCESTER, MASS., BY AMERICAN FISHING VESSELS DURING 1909, BY MONTHS—Continued.

| Month. | Mackerel. | | | | Other fish.[a] | | | | Total. | | | | Grand total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Fresh. | | Salted. | | Fresh. | | Salted. | | Fresh. | | Salted. | | | |
| LANDED AT BOSTON. | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* |
| January | | | | | | | | | 5,357,400 | $137,277 | | | 5,357,400 | $137,277 |
| February | | | | | | | | | 6,950,300 | 207,955 | | | 6,950,300 | 207,955 |
| March | | | | | | | | | 8,622,200 | 237,024 | | | 8,622,200 | 237,024 |
| April | | | | | | | | | 6,921,100 | 167,450 | | | 6,921,100 | 167,450 |
| May | | | | | | | | | 5,500,000 | 121,939 | | | 5,500,000 | 121,939 |
| June | 1,574,650 | 897,896 | 253,900 | $12,751 | | | | | 8,030,950 | 244,632 | 253,900 | $12,751 | 8,284,850 | 257,383 |
| July | 1,437,400 | 65,837 | 161,800 | 6,607 | 938,800 | $80,938 | | | 9,497,000 | 296,060 | 161,800 | 6,607 | 9,658,800 | 302,667 |
| August | 509,250 | 33,183 | 54,400 | 4,706 | 580,000 | 62,325 | | | 8,289,950 | 267,826 | 54,400 | 4,706 | 8,344,350 | 272,532 |
| September | | | 20,800 | 1,336 | 104,600 | 13,397 | | | 8,953,450 | 202,016 | 20,800 | 1,336 | 8,974,250 | 203,352 |
| October | | | | | 7,400 | 1,161 | | | 10,554,150 | 228,773 | | | 10,554,150 | 228,773 |
| November | | | | | 800 | 96 | | | 7,771,700 | 190,537 | | | 7,771,700 | 190,537 |
| December | | | | | | | | | 5,636,550 | 186,079 | | | 5,636,550 | 186,079 |
| Total | 3,521,300 | 196,826 | 490,900 | 25,400 | 1,631,600 | 157,917 | | | 92,084,750 | 2,487,568 | 490,900 | 25,400 | 92,575,650 | 2,512,968 |
| LANDED AT GLOUCESTER. | | | | | | | | | | | | | | |
| January | | | | | 4,027,250 | 103,453 | 1,245,344 | $24,389 | 4,934,419 | 132,116 | 1,555,184 | 34,738 | 6,489,603 | 166,854 |
| February | | | | | | | | | 1,054,262 | 40,876 | 93,120 | 2,938 | 1,147,382 | 43,814 |
| March | | | | | | | | | 1,678,168 | 46,650 | 215,583 | 7,305 | 1,893,751 | 53,955 |
| April | | | | | | | | | 1,743,237 | 40,035 | 172,691 | 5,772 | 1,915,928 | 45,807 |
| May | | | | | | | 853,800 | 17,076 | 2,206,349 | 34,884 | 1,872,178 | 45,960 | 4,078,527 | 80,844 |
| June | 202,680 | 7,391 | 2,051,400 | 105,439 | 193,800 | 1,781 | | | 3,024,975 | 51,887 | 5,987,932 | 213,898 | 9,012,907 | 265,785 |
| July | 311,400 | 15,040 | 149,800 | 7,198 | 344,322 | 1,924 | | | 3,388,351 | 64,018 | 5,246,499 | 150,839 | 8,634,850 | 214,857 |
| August | 76,320 | 3,852 | 337,600 | 29,519 | 154,650 | 986 | 27,000 | 574 | 2,503,309 | 49,165 | 6,031,444 | 203,013 | 8,534,753 | 252,178 |
| September | 9,360 | 828 | 50,000 | 3,041 | 389,050 | 2,035 | 8,000 | 160 | 4,074,557 | 64,431 | 6,717,100 | 232,258 | 10,791,657 | 296,689 |
| October | | | 144,200 | 15,678 | | | 53,000 | 949 | 3,785,971 | 59,229 | 6,374,685 | 210,544 | 10,160,656 | 269,773 |
| November | | | 234,000 | 25,876 | 1,034 | 124 | 1,153,520 | 20,872 | 3,274,500 | 43,757 | 6,669,236 | 206,194 | 9,943,736 | 249,951 |
| December | | | | | 375,000 | 12,000 | 5,964,000 | 101,408 | 878,220 | 28,485 | 7,044,604 | 134,484 | 7,922,824 | 162,969 |
| Total | 599,760 | 27,111 | 2,967,000 | 186,751 | 5,485,106 | 122,303 | 9,304,664 | 165,428 | 32,546,318 | 655,533 | 47,980,256 | 1,447,943 | 80,526,574 | 2,103,476 |
| Grand total | 4,121,060 | 223,937 | 3,457,900 | 212,151 | 7,116,706 | 280,220 | 9,304,664 | 165,428 | 124,631,068 | 3,143,101 | 48,471,156 | 1,473,343 | 173,102,224 | 4,616,444 |
| Grounds E. of 66° W. long | 1,660,060 | 91,230 | 2,663,500 | 156,901 | 4,331,886 | 115,379 | 9,191,864 | 163,373 | 25,910,134 | 760,969 | 42,710,269 | 1,270,031 | 68,620,403 | 2,031,000 |
| Grounds W. of 66° W. long | 2,461,000 | 132,707 | 794,400 | 55,250 | 2,784,820 | 164,841 | 112,800 | 2,055 | 98,720,934 | 2,382,132 | 5,760,887 | 203,312 | 104,481,821 | 2,585,444 |
| Landed at Boston in 1908 | 4,422,310 | 233,125 | 266,600 | 17,099 | 1,481,620 | 120,270 | 680,000 | 13,600 | 94,713,080 | 2,534,311 | 946,600 | 30,699 | 95,659,680 | 2,565,010 |
| Landed at Gloucester in 1908 | 1,085,510 | 75,469 | 3,200,600 | 158,416 | 7,464,804 | 131,078 | 7,948,796 | 124,092 | 49,883,233 | 921,476 | 35,922,334 | 1,142,939 | 85,805,567 | 2,064,415 |

[a] Includes herring from Newfoundland (4,296,250 pounds frozen, $113,535, and 9,029,756 pounds salted, $160,529).

More than 60 per cent of the quantity and nearly the same proportion of the value of the fishery products landed at Boston and Gloucester by the American fishing fleet during the year were caught on fishing grounds lying off the coast of the United States. A little over 28 per cent of the catch was from banks off the coast of the Canadian Provinces and 11.25 per cent from grounds off the coast of Newfoundland. The Newfoundland herring fishery furnished less than 8 per cent of the fishery products landed at these ports. The quantity and value of the catch from each of these fishing regions are given by species in the following table:

QUANTITY AND VALUE OF FISH LANDED BY AMERICAN FISHING VESSELS AT BOSTON AND GLOUCESTER, MASS., IN 1909, FROM GROUNDS OFF THE COASTS OF THE UNITED STATES, NEWFOUNDLAND, AND CANADIAN PROVINCES.

| Species. | United States. | | Newfoundland. | | Canadian Provinces. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* | *Pounds.* | *Value.* |
| Cod: | | | | | | | | |
| Fresh | 28,031,010 | $765,402 | 88,810 | $1,492 | 10,470,311 | $188,253 | 38,590,131 | $955,147 |
| Salted | 4,158,127 | 137,120 | 3,828,665 | 113,087 | 24,757,580 | 753,446 | 32,744,372 | 1,003,653 |
| Cusk: | | | | | | | | |
| Fresh | 2,608,626 | 41,022 | 7,660 | 123 | 531,652 | 8,746 | 3,147,938 | 49,891 |
| Salted | 105,627 | 2,637 | 7,690 | 191 | 72,218 | 1,809 | 185,535 | 4,637 |
| Haddock: | | | | | | | | |
| Fresh | 37,345,145 | 907,965 | ..... | ..... | 5,055,621 | 115,054 | 42,400,766 | 1,023,019 |
| Salted | 186,428 | 1,885 | 11,235 | 113 | 226,940 | 2,291 | 424,603 | 4,289 |
| Hake: | | | | | | | | |
| Fresh | 12,668,503 | 186,176 | 11,278 | 70 | 483,460 | 7,572 | 13,163,241 | 193,818 |
| Salted | 25,176 | 252 | 10,947 | 132 | 77,201 | 789 | 113,324 | 1,173 |
| Pollock: | | | | | | | | |
| Fresh | 12,355,229 | 145,111 | 100 | 1 | 147,262 | 1,951 | 12,502,591 | 147,063 |
| Salted | 373,869 | 3,805 | 36,620 | 367 | 970,156 | 11,369 | 1,380,645 | 15,541 |
| Halibut: | | | | | | | | |
| Fresh | 418,691 | 38,530 | 1,349,221 | 94,603 | 1,820,723 | 136,873 | 3,588,635 | 270,006 |
| Salted | 4,460 | 308 | 803,489 | 63,004 | 52,164 | 3,159 | 860,113 | 66,471 |
| Mackerel: | | | | | | | | |
| Fresh | 2,461,000 | 132,707 | ..... | ..... | 1,660,060 | 91,230 | 4,121,060 | 223,937 |
| Salted | 794,400 | 55,250 | ..... | ..... | 2,663,500 | 156,901 | 3,457,900 | 212,151 |
| Herring: | | | | | | | | |
| Fresh | 99,600 | 1,651 | 4,296,250 | 113,535 | 25,000 | 500 | 4,420,850 | 115,686 |
| Salted | 85,800 | 1,481 | 9,029,756 | 160,529 | 162,108 | 2,844 | 9,277,664 | 164,854 |
| Swordfish: | | | | | | | | |
| Fresh | 1,626,520 | 157,185 | 394 | 47 | 10,242 | 1,297 | 1,637,156 | 158,529 |
| Other fish: | | | | | | | | |
| Fresh | 1,058,700 | 6,005 | ..... | ..... | ..... | ..... | 1,058,700 | 6,005 |
| Salted | 27,000 | 574 | ..... | ..... | ..... | ..... | 27,000 | 574 |
| Total | 104,433,911 | 2,585,066 | 19,482,115 | 547,294 | 49,186,198 | 1,484,084 | 173,102,224 | 4,616,444 |

## SHAD AND ALEWIFE FISHERIES.

The canvass relating to the methods, apparatus, extent, and condition of the shad and alewife fisheries of Chesapeake Bay and tributaries, which was begun in the spring of 1909, was completed before the close of that year, the work being done by the steamer *Fish Hawk* and field agents. The fishing apparatus used in the capture of shad and alewives was located on charts, and statistics of the catch for the season of 1909 were obtained. The fishing apparatus included 3,332 pound nets, 12,768 gill nets, and a considerable number of seines, fyke nets, and other appliances. The catch consisted of 2,924,018 shad, having a value to the fishermen of $785,739, and 128,618,249 alewives, with a value of $284,039. The shad were sold

fresh, and the alewives were disposed of in both a fresh and salted condition, the number salted being 16,827,000, valued at $74,419. The shad catch has declined nearly 50 per cent in quantity since 1897, the number of shad taken that year in the Chesapeake and tributaries being 5,341,751. In 1901 the number had decreased to 3,000,544, and in 1904 to 2,950,492. A still further decrease of 26,474 occurred in the past year. This large falling off during these years is obviously due to overfishing and to the fact that the large number of pound nets and other apparatus operated prevent the anadromous species from reaching their spawning grounds, thus seriously interfering with both natural and artificial propagation. In Virginia in 1909 there were fished in these waters for shad and alewives 2,043 pound nets and 7,121 gill nets, and in Maryland 1,289 pound nets and 5,620 gill nets, the remainder of the gill nets being in Pennsylvania and Delaware. The catch apportioned by States in 1909 was as follows:

| State. | Shad. | | Alewives. | |
|---|---|---|---|---|
| | *Number.* | *Value.* | *Number.* | *Value.* |
| Virginia | 1,855,446 | $488,336 | 69,469,949 | $128,375 |
| Maryland | 1,000,827 | 272,869 | 59,093,300 | 155,499 |
| Pennsylvania | 60,045 | 22,224 | 25,000 | 75 |
| Delaware | 7,700 | 2,310 | 30,000 | 90 |
| Total | 2,924,018 | 785,739 | 128,618,249 | 284,039 |

## INVESTIGATION OF THE MACKEREL FISHERY.

The mackerel investigation, which was begun in April, 1909, at the request of the Board of Trade and Master Mariners' Association of Gloucester, Mass., representing many of the firms and vessel owners interested in the mackerel fishery, was concluded in October of that year, occupying a period of about six months. The schooner *Grampus* was detailed for the work, and Capt. Jerry E. Cook, an experienced mackerel fisherman of Gloucester, was in charge of the inquiry. The vessel was equipped with gill nets and lines for locating the fish and with tow nets for use in detecting the presence of the minute crustaceans which form the principal food of the mackerel. The object of the inquiry was chiefly to determine the movements of the mackerel, which usually make their first appearance on the American coast in the spring off Cape Hatteras and gradually move northward to the Gulf of St. Lawrence, to locate any bodies of mackerel that may frequent grounds remote from those cruised over by the fishermen, and also to assist the mackerel fishermen by furnishing them with information as to the schools of mackerel seen and their location and movements.

It is thought by some fishermen that the introduction of purse seines and gill nets in the fishery, replacing hooks and lines and a

plentiful supply of toll bait, has had a tendency to disperse the schools of mackerel and is partly responsible for the prevailing scarcity of that species during the past twenty or more years. This opinion, however, has not become sufficiently strong or general to lead to any concerted action on the part of the vessel owners with a view to abandoning the use of these forms of apparatus in the mackerel fishery and returning to the former methods.

The *Grampus* sailed from Gloucester April 7 and proceeded southward to Lewes, Del., where she joined the seining fleet. On May 2 the vessel sailed from that port to begin the work of investigating the movements of the mackerel. The first experiments were made on that date in latitude 38° N. and longitude 74° 21′ W. The work was continued along the coast from this locality to Georges Bank until the 1st of August, but chiefly on the southern grounds in order to ascertain whether the mackerel remain there after making their first appearance early in the spring or move northward. The fish were not located there, however, after the early run in the spring, nor were any of the usual signs of them, such as sea geese, red feed, whales, etc., observed. The vessel worked over Georges Bank and continued eastward over Browns Bank, and on August 5 anchored at Sandy Point, Shelbourne, Nova Scotia. She sailed from there on the 8th of August, and from Halifax on the 12th, reaching North Sydney, Cape Breton, on the 15th. For the remainder of August and during September the work was pursued in the Gulf of St. Lawrence and on the southerly part of the coast of Newfoundland. The *Grampus* left the Gulf of St. Lawrence early in October and arrived at Gloucester on the 16th of that month. At all times during the cruise a masthead lookout for mackerel was kept day and night when the weather was favorable for observation, and net trials for locating the fish were made at every opportunity.

During the first part of the trip the work was frequently interrupted by stormy weather, which also at times greatly interfered with the operations of the seining fleet. The mackerel were late in showing, and were unusually far offshore. Investigation showed that the latter condition was caused by the appearance of great schools of bonito, which came up the coast over the usual mackerel route and kept the schools of mackerel well offshore, and later, when the mackerel approached their regular course, caused them not to show, but to move along under water. This was indicated by the many large hauls made by the vessels of the mackerel netting fleet, which did unusually well, while the purse-seine fishermen, depending on the mackerel to school and show, had a poor season as a whole. There was a good catch on the Nova Scotia coast, or Cape Shore, and the vessels did well for a time on Nantucket Shoals, but otherwise the season was practically a failure. A few hauls were made on the southern edge

of Georges Bank, but the fish stayed there only a short time, disappearing as suddenly as they came. In Massachusetts Bay and on the Maine coast there was practically no mackerel fishing, a few small schools taken off Monhegan being all that showed on the latter shore. The season in the Gulf of St. Lawrence was also a poor one, the catch of the 22 American purse-seining vessels that went there being only 1,785 barrels. No fish were found schooling, and the catches made were secured by throwing toll bait and using line and jig, the seine being run around the vessel while the fish were attracted by the bait. Bad weather set in early and fishing off North Sydney was discontinued before the usual time.

The cruise did not result in ascertaining where the southern body of mackerel goes after coming as far north as Long Island nor in locating the great body of mackerel which goes into the Gulf of St. Lawrence, but that large schools entered the Gulf of St. Lawrence in June and, some of them at least, came out in the fall and went south is indicated by the fact that large catches were made off Halifax and La Have and westward as far as Cape Sable, and that great schools were reported off Halifax and other Cape Shore ports late in the season. It is evident from the experiments and observations made during the cruise that the food supply and spawning habits of the mackerel are not the only factors to be considered in the study of their migrations, but that the weather conditions and the presence of bonito and other predatory species have a decided influence on their movements. A plentiful supply of food was frequently found in localities where there were either no mackerel or only scattering individuals.

The *Grampus* kept in as close touch with the seining fleet as was consistent with the work, and furnished the vessels with all information obtained regarding the schools of mackerel seen.

Considerable information was also obtained during the cruise regarding the movements of menhaden. These fish were reported by the mackerel seiners early in April about 25 miles off Bodie Island, North Carolina, in 45 fathoms of water. They were in large schools and appeared to be working northward and keeping well offshore. About the 20th of the month large schools were observed in 36° 30′ north latitude and extending a distance of about 90 miles. A number of menhaden were taken in the mackerel seines about this time, and were large and moderately fat fish. During April large schools of bonito were seen some distance inshore of the menhaden, which was apparently the reason why the latter remained so far offshore. One vessel reported sailing 25 miles with bonito constantly in sight, moving rapidly and at times breaking water, probably in pursuit of some small feed other than menhaden. No schools of bonito were seen north of the Virginia capes, and the menhaden appeared on the coast of New Jersey early in May after the bonito disappeared.

## FISHERIES OF MISSISSIPPI.

At the request of citizens of Biloxi, Miss., through their Representative in Congress, an investigation was made of the condition of the fisheries at that place, and incidentally of the coast fisheries of the entire State, not including oysters.

The fisheries of Mississippi are chiefly carried on at Biloxi and Scranton, the former place having about 250 vessels and boats and the latter about 50 engaged in this industry. The principal species taken are shrimp (which ranks first in importance), bluefish, Spanish mackerel, pompano, mullet, flounders, trout or squeteague, and crabs. In former years the supply was generally equal to the demand, but in the last three or four years it is claimed by fishermen and others interested in the fisheries that there has been considerable falling off in the annual catch of most species, on account of overfishing.

While the coast fisheries of Mississippi are not as extensive as those of some other States, they are of great value to the State and should receive as careful attention in the way of protection as other States give to their fisheries. Many fishermen and dealers at Biloxi are of the opinion that artificial propagation is the only means by which the more important commercial species can be saved from extermination, but a judicious enforcement of laws that should be enacted to prevent the wholesale capture of fish during the spawning season, and making it a penal offense to capture fish by the use of dynamite, lime, or other explosives in rivers, lakes, bayous, or along the coast, would have a tendency to restore the fisheries to their former prosperous condition. This course of action would no doubt produce beneficial results in a comparatively short time. The first requisite in the present circumstances seems to be to take the necessary steps to save certain species by natural rather than by artificial means. The establishment of a state fish commission, with authority to recommend and enforce fishery legislation, would also be of great assistance in protecting and maintaining the fisheries. Without such an organization the fisheries are destined to decline more rapidly in the future than they have in the past.

The principal forms of fishing apparatus used in the fisheries of the State are drag seines, gill nets, and trammel nets. There is also a considerable quantity of fish taken with cast nets. In no part of the country is this apparatus used with greater skill than in this region, and according to some of the fishermen its extensive use is responsible for the great scarcity of crappie, black bass, and pike. When the water in the rivers and bays is low, many species of fish take refuge in pools and deep holes and are easily captured.

In Red and Black creeks it is said that fish were once abundant, but in recent years the use of dynamite has nearly exterminated them. According to reports, this method is not only employed by commer-

cial fishermen but also by people who wish to supply their own table. Jugs filled with lime and lowered to the bottom are also the means of destroying large quantities of fish. The water coming in contact with the lime causes the jugs to burst, scattering the lime, which either kills the fish or causes them to rise to the surface in a dazed condition, making their capture easy.

At Biloxi the harbor for vessels is at Back Bay. Six or seven years ago considerable fishing was carried on from 2 to 3 miles above the anchorage, toward the head of the bay. At the present time very few fish are taken in this vicinity. At times during a freshet buffalo-fish are caught in considerable quantities near the mouth of the bay. At other times this species is generally observed up the bay some 6 or 8 miles above Popps Point, where commercial fishing is prohibited. During a heavy freshet it is said that the current runs 15 miles an hour.

In the upper part of the bay there are numerous small islands covered with tule grass; these islands afford excellent seining grounds. In the channels formed by the islands fishing is carried on with trammel nets. There are many snags in the channels, which prevent the use of drag seines.

Shrimp were quite scarce in 1909, but in the spring of 1910 they were plentiful, and the usual pack was made. It is estimated that in the vicinity of Gulfport and Biloxi 6,000 barrels of shrimp were caught during the season. It is stated that only about one-half the quantity of shrimp is now taken as compared to the catch ten years ago, although nearly double the number of men and boats is employed. In the last few years, however, there has been considerable increase in the catch, owing to an extension of the fishing grounds. Vessels now fish for shrimp 30 miles east and west of Biloxi and from 75 to 100 miles south.

Shrimp arrive from the south in the latter part of February and remain on the coast until May. In the latter part of July or the first of August a school of mixed sizes of shrimp appear, and in September another school of marketable shrimp strikes the coast.

In 1909, 14,000 pounds of mullet were taken in one haul of a seine and all were said to be spawn fish. Many fishermen are of the opinion that such wholesale slaughter of spawn fish should be stopped.

Redfish or channel bass, trout or squeteague, and sheepshead have not decreased as rapidly as some other species, being taken in deep water, and principally with hook and line.

The shipping facilities and method of handling fish at Biloxi compare favorably with those in other parts of the country. On account of the scarcity of many shore species, attention is being directed to the red-snapper fishery. To engage in this fishery would require deeper draft vessels and the building of plants for handling fish on the outlying islands, where vessels arriving from the banks could

land their fares and transship them in scows or other shallow boats to Biloxi. In this manner the red-snapper fishery might be established and successfully prosecuted.

## MISCELLANEOUS ACTIVITIES.

### RELATIONS WITH OTHER GOVERNMENT BUREAUS.

During the year the Bureau has cooperated with other branches of the Government, both giving and receiving assistance in the interests of an economical and efficient administration of the public business. The assistance rendered to the Bureau of the Census in the statistical canvass of the fisheries in the preceding fiscal year was supplemented by the detail of an agent of the Bureau to aid in certain technical matters connected with the compilation of the data. This assistance consisted principally in the identification and consideration of the involved and often dubious nomenclature of the fishes exhibited in the field schedules.

A large number of samples of fishery products have been identified and passed on at the request of the food and drug board of the Department of Agriculture, and other assistance has been rendered in connection with the functions of that board.

In March, 1910, on request of the Secretary of War preferred through the Department, an examination and appraisal was made of certain oyster bottoms adjoining the military reservation at Fort Monroe, Va., recently ceded by the State of Virginia to the Federal Government. A full report, accompanied by tracings, was transmitted to the War Department.

The Bureau expresses its appreciation of the services of the Bureau of Chemistry of the Department of Agriculture for analyses of water from various hatcheries and to the Coast and Geodetic Survey for various charts and projections and for other courtesies extended.

### INTERNATIONAL FISHERY MATTERS.

In 1909, as in the four previous years, at the request of the Department of State, the Bureau detailed a representative to visit Newfoundland for the purpose of observing the operations of American fishing vessels engaged in the herring fisheries there under the provisions of the modus vivendi. The detail extended from October, 1909, to January, 1910. No vessel was assigned to the work this year. In June, 1910, two representatives from the Bureau's official staff were detailed to The Hague to assist the American counsel in the case before that tribunal for a settlement of the dispute as to the rights of our fishermen in Newfoundland and Canadian waters under the treaty of 1818.

The Bureau continued its cooperation with the State Department, through the International Fisheries Commission, in securing basic

data for the regulations required by the treaty between the United States and Great Britain, signed April 11, 1908, which provides for the joint control by the United States and Canada of the fisheries in the waters contiguous to the boundary between the two countries. Field work was conducted in Passamaquoddy Bay and eastern Maine and on Lake Erie and Lake Huron.

There is every reason to believe that both of these international questions, which have long been a source of irritation to the fishermen of the countries involved, will be satisfactorily adjusted during the present year.

EMPLOYMENT OF VESSELS.

The investigation concerning the aquatic resources of the Philippine Islands was continued by the steamer *Albatross* until February 12, when she went to Nagasaki for a general overhauling before undertaking the voyage to the United States. She arrived at San Francisco in excellent condition May 4, and was promptly made ready for immediate work in Alaskan waters. While the vessel underwent considerable repairs in Hongkong the year before, these were necessitated by work previous to the Philippine expedition and the fact that she returned to San Francisco in such good condition after a cruise beginning in 1907 reflects credit on the construction of the vessel and the care given by her commanding officers.

The steamer *Fish Hawk* was occupied from the beginning of the fiscal year until the middle of September in a comprehensive survey of the public oyster grounds of Virginia in the James River, and afterwards in collecting aquarium specimens. In October the ship went to Woods Hole, where her machinery was put in good order by the station force and the crew and the vessel made ready for further work. In the spring, shad hatching on the Delaware River was begun and continued until June, when a survey of the public oyster grounds of Delaware was commenced and at the close of the year was still in progress. Fuller references to the surveys mentioned are embodied elsewhere in this report.

The schooner *Grampus* was engaged in the mackerel investigation referred to elsewhere until October 10, 1909, her sphere of operations extending from Newport to Bay of Islands, Newfoundland, and the Gulf of St. Lawrence, and including the offshore fishing banks. During the late fall and winter the vessel was laid up and the crew utilized in connection with marine fish-cultural work on the New England coast until April, when she was made ready for sea and began the collection of lobster eggs and distribution of lobster fry for the hatchery at Boothbay Harbor, Me., and was so engaged the remainder of the year.

The smaller steamer *Phalarope* was used during the entire year in fish-cultural work on the New England coast and on the Potomac

River, and as a collecting vessel for the Woods Hole laboratory. The *Curlew* was employed on the Mississippi River, especially in collecting fishes from the overflowed lands.

### PUBLICATIONS AND LIBRARY.

The collection of special books maintained by the Bureau for purposes of reference and technical investigation has received 260 accessions in Washington from gifts, purchases, and exchanges, and over 200 accessions at the laboratories and stations elsewhere. The intimate relations maintained with other libraries result in exchanges and transfers which are mutually profitable, and particularly advantageous to the Bureau in view of the limited funds available for the purchase of books and periodicals. The use of the library has been much facilitated by the progress made during the year on the systematic subject catalogue.

The continued interest of the public in the work of the Bureau is shown by the facts that during the year 2,916 bound volumes and 21,832 pamphlets of its publications were sent out on request, 45,890 were required for the regular mailing list, and 2,020 issued to authors. There were received from the Government Printing Office for distribution 87 new reports and bulletins published by the Bureau and 5 reprints of important documents the supply of which had been exhausted. The titles of the new issues (No. 646 to No. 732) may be found in the Bureau's list of publications available for distribution.

### APPROPRIATIONS.

The total appropriations for the Bureau for the fiscal year amounted to $823,490, or $16,610 less than the aggregate for the previous year.

| | |
|---|---|
| Salaries: | |
| General | $316,860 |
| Agents at Alaska salmon fisheries | 4,500 |
| Agents at seal fisheries | 11,430 |
| Miscellaneous expenses: | |
| Administration | 8,000 |
| Propagation of food fishes | 275,000 |
| Inquiry respecting food fishes | 30,000 |
| Statistical inquiry | 7,500 |
| Maintenance of vessels | 55,000 |
| Supplies for native inhabitants, seal islands | 19,500 |
| Specials: | |
| Establishment of fish-cultural stations on Puget Sound or its tributaries | 50,000 |
| Establishment of a fish-cultural station in the upper Mississippi Valley | 25,000 |
| Purchase of a steamboat, Put-in-Bay, Ohio | 15,000 |
| Construction of roadway, Greenlake, Me | 2,700 |
| Repairs to buildings, Pribilof Islands | 3,000 |

In addition to the above funds, the sum of $150,000 was appropriated and made immediately available for the purpose of carrying out the provisions of the act of April 21, 1910, which placed under the Secretary of Commerce and Labor the administration of the fur-seal islands and the preservation of the fur-bearing animals of Alaska.

An itemized statement of expenditures authorized by the foregoing appropriations will be made as required by law.

## RECOMMENDATIONS.

### REORGANIZATION OF PERSONNEL.

The foregoing report exhibits briefly the rapid growth of the activities and responsibilities of the Bureau by natural accretion to lines of work long established and by the addition of functions not contemplated when the present organization was adopted. The assignment of new duties to the Bureau has made it necessary to impose them upon persons whose time and attention were already fully taxed by the natural development of their previous responsibilities, and it therefore appears to be essential to the continued efficiency of the Bureau that there should be a reorganization of the personnel. The Alaska salmon service and the fur-seal service, now assigned to the Bureau, both involving executive and police functions of an exacting character, are administered by the Division of Scientific Inquiry, from which it is desirable that they be separated. The original requirements of the division are incompatible with the added functions, and their continued administration by one person can only be at the sacrifice of the efficiency of both. It is therefore recommended that the present organization be augmented by the creation of a new division to be known as the Division of Alaska Fisheries, with sufficient additions to the present force to make its work effective.

The United States has entered into certain treaty obligations in respect to the waters adjacent to the Canadian boundary, whereby it is proposed to assume international control of the fisheries in the interest of their conservation and development. Regulations making this agreement effective were submitted to the Senate but were returned to the joint commissioners for further consideration. It is assumed that they will be reduced to a satisfactory basis in the near future, in which event the Bureau will find itself charged with enforcing them. Should this be the case, since under the present organization there is no provision for the discharge of this duty, it will be necessary to provide a Division of International Fisheries.

### SALARIES AND PERSONNEL.

The recommendations of the preceding fiscal year in reference to the increase of the salaries attached to certain positions in its service are renewed. Congress at its recent session increased the pay of low-

grade clerks, firemen, and messengers, but did not authorize any advance in the salaries of those on whose work the efficiency of the Bureau is more directly dependent. The experience of another year has made more apparent the desirability of making remuneration more commensurate with duties and responsibilities.

The Bureau is in constant receipt of requests from Members of Congress and state authorities for special investigations and experiments in the interests of the public fisheries, and in many cases prompt compliance with these legitimate demands is difficult or impossible, because the personnel has not kept pace with either the growth of the work or the increase of general appropriations. There are certain fisheries to which, on account of their peculiar requirements, it has not been possible to render the service which those engaged in them have the right to expect. To the oyster industry, for instance, which yields $16,000,000 annually, about 30 per cent of the value of the entire fisheries of the United States, the Bureau's assistance has been wholly inadequate. Proportionately to the value of the respective fisheries, sixty-five dollars are profitably expended in shad culture for every dollar spent for the benefit of the oyster industry. The inequality arises not from the inability to allot money from the appropriations, but to the lack of trained and experienced men. Fish-cultural methods can not be applied in oyster culture, and the only valuable aid which can be offered is through the medium of research and practical experiment, which experience has shown lead to profitable and lasting benefits from disproportionally small expenditures. For carrying on such work provision should be made for additional scientific assistants.

## SPONGE LAW.

The act of June 20, 1906, to provide for the protection of the sponge fisheries of the United States on the high seas of the Gulf of Mexico and the Straits of Florida, has shown itself futile and impossible of enforcement. The purpose of this law was to prohibit the fishery by diving in depths of less than 50 feet, and during the period from May 1 to October 1 to prevent the taking, by whatever means, outside of the 3-mile limit, of sponges smaller than 4 inches in diameter.

The offenses aimed at are not specifically prohibited, but they were supposed to be prevented by the prohibition of certain subsidiary acts—the landing, curing, or offering for sale in the United States of sponges taken in contravention of the real purpose of the law. To secure a conviction it is therefore necessary to establish a connection between the act of taking under the objectionable circumstances and certain subsequent and secondary acts which per se are innocuous. A diving vessel operating during the close

season can not be interfered with until the sponges are landed, cured, or offered for sale in the United States. The sponges, therefore, must be followed or traced from their beds in the high seas to a point of territorial jurisdiction, a requirement that is usually impossible of enforcement.

Moreover, the law provided the Department with no machinery for its enforcement. It has been necessary to depend upon the courtesy of the Treasury Department for the personnel required, and no provision has been made for expenses.

In view of the circumstances narrated, and in the interest of the unimpaired maintenance of the sponge beds, it is recommended that the act of June 20, 1906, be amended to correct its defects and that the Bureau be provided with an inspector, a suitable boat, and funds for the proper enforcement of the law. It is further recommended that the minimum size of sponges which it shall be legitimate to take be established at 5 inches diameter, and if this be done that the close season be curtailed by not exceeding two months.

### EXTENSION OF FISH CULTURE.

It is again urged that provision be made for the establishment of additional stations for the rescue of fishes from overflowed lands in the Mississippi Valley. Millions of fish now annually left by the receding waters to die of exposure can by this means be saved at small expense.

The Bureau is of the opinion that a highly important work of the near future will be the stocking of ponds and streams on the farms of the country with hardy species of fish requiring little care or attention and omnivorous as to diet. The several species of catfishes appear to fulfill the requirements more completely than any other fish. They will grow in sluggish and muddy water, they are very tenacious of life, their diet is of wide variety, and as food they are excelled by but few fresh-water fish. While some of the smaller species can be made important additions to the home food supplies of the farms, certain others, particularly the larger ones, are already the basis of important commercial fisheries. For the propagation of both kinds the establishment of a station at some point in the lower Mississippi Valley, preferably near Morgan City, La., is regarded as highly desirable.

The fish-cultural work in Yellowstone Park has been conducted heretofore with inadequate means as an adjunct to the operation of Spearfish Hatchery, but it is believed that the opportunities in the national park are such as to warrant an independent station. One of the chief difficulties encountered in the efforts to replenish the depleted fisheries of the United States arises from the lack of control

over the fishes after they are planted and the neglect of certain States to make provision for their protection. Yellowstone Park, being under federal jurisdiction, offers an exceptional opportunity to demonstrate the possibilities of fish culture under rational and consistent regulations.

The Bureau also recommends the establishment of one marine and one additional fresh-water hatchery on the Pacific coast, and an additional station in Texas for the supply of a demand for fish in the Southwest which it is at present impossible to satisfy.

### LABORATORY FOR THE STUDY OF FISH DISEASES.

There is again urged the importance of a station for the study of fish diseases and experiments in the interests of fish culture. In some of the hatcheries of the Bureau and in similar establishments under state and private auspices certain fish diseases have become so prevalent as to make it a matter of grave consideration whether the propagation of certain species, especially the trouts, should not be abandoned. It frequently occurs that the fish and fry are decimated by epidemics for which there are no known remedies, in consequence of which there are annually entailed on fish culture large wastes of time and money. In addition to the financial loss, embarrassment arises at times in filling legitimate demands for fish for restocking depleted waters, and the effect on the morale of the employees of the Bureau who have to struggle hopelessly against an obscure disease is not unworthy of consideration. The gravest phase of the matter, however, is the possible relationship of some of these diseases to more or less kindred affections occurring in human beings. It has been determined that a type of cancerous affection is of widespread distribution among domesticated trout and their offspring planted in the streams. Whether this disease has a causal relation to cancer in human beings, or whether the two are to be even traced to the same source, is a matter of doubt, but the annually increasing mortality from cancer in man and certain remarkable coincidences in the geographical distribution of the disease in man and fish render it imperative that it should be made the subject of minute inquiry. The matter therefore has not only economic but humanitarian aspects, and the consideration of the serious character of the latter prompted the President to submit to Congress on April 9, 1910, a special message advocating an appropriation of $50,000 for the construction and equipment of a laboratory adequate to enable the Bureau to discharge its plain obligations. The Bureau in the meantime is proceeding in the investigation to the limit of its powers, but it may be stated emphatically that it can make but little progress without the special facilities asked for.

### FISHERY INTELLIGENCE SERVICE.

For many years the Bureau has maintained at Boston and Gloucester, Mass., a service making current statistical reports on the fisheries of those ports. This service has the strong support of the commercial interests, and a proposition for its abandonment would result in instant and vigorous protest. The large fishery interests of the Pacific coast are becoming insistent in their requests that a similar service be inaugurated in that region, and the Bureau regards the work of such importance as to impel it to recommend provision for a suitable personnel for the purpose. In view of the regard in which the reports at Boston and Gloucester are held by the fishery interests, it would appear desirable to gradually extend the service to other places on the Atlantic and Gulf coasts having extensive vessel fisheries.

### NEW BUILDING.

As has been repeatedly indicated in these reports, the quarters of the Bureau are antiquated, crowded, unsafe, and inadequate in every respect. They impede the transaction of the public business and interfere with efficiency and development. It is again earnestly recommended that provision be made for a building which will furnish offices, laboratories, workrooms, and an aquarium national in scope and in keeping with necessitous requirements.

Respectfully,

GEO. M. BOWERS,
*Commissioner.*

To Hon. CHARLES NAGEL,
*Secretary of Commerce and Labor.*

# THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1910

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Bureau of Fisheries Document No. 740

# CONTENTS.


| | Page. |
|---|---|
| Character of the work | 5 |
| Method of distribution | 5 |
| Size of fish when distributed | 6 |
| Size of allotments | 7 |
| Species cultivated in 1910 | 7 |
| Output | 9 |
| Statement of output by stations | 10 |
| Allotments to State fish commissions | 24 |
| Shipments to foreign countries | 24 |
| Summarized statement of distributions | 25 |
| Details of the distributions | 26 |


## INDEX TO SPECIES.


| | Page. |
|---|---|
| Atlantic salmon | 39 |
| Bass, large-mouth black | 88 |
| rock | 83 |
| sea | 110 |
| small-mouth black | 86 |
| strawberry | 81 |
| striped | 109 |
| warmouth | 85 |
| white | 109 |
| yellow | 110 |
| Blackspotted trout | 40 |
| Blueback salmon | 30 |
| Bream | 101 |
| Brook trout | 41 |
| Buffalofish | 28 |
| Carp | 27 |
| Catfish | 26 |
| Chinook salmon | 30 |
| Cisco | 29 |
| Cod | 111 |
| Crappie | 81 |
| Drum, fresh-water | 111 |
| Flatfish | 112 |
| Fresh-water drum | 111 |
| Grayling | 80 |
| Haddock | 111 |
| Humpback salmon | 30 |
| Lake herring | 29 |
| Lake trout | 43 |
| Landlocked salmon | 39 |
| Large-mouth black bass | 88 |
| Lobsters | 112 |
| Loch Leven trout | 43 |
| Mackerel | 110 |
| Perch, pike | 105 |
| white | 110 |
| Perch, yellow | 107 |
| Pickerel | 80 |
| Pike | 80 |
| Pike perch | 105 |
| Pollock | 111 |
| Rainbow trout | 31 |
| Rock bass | 83 |
| Salmon, Atlantic | 39 |
| blueback | 30 |
| chinook | 30 |
| humpback | 30 |
| landlocked | 39 |
| silver | 29 |
| Sea bass | 110 |
| Shad | 28 |
| Silver salmon | 29 |
| Small-mouth black bass | 86 |
| Smelt | 80 |
| Steelhead trout | 31 |
| Strawberry bass | 81 |
| Striped bass | 109 |
| Sunapee trout | 80 |
| Sunfish | 101 |
| Trout, brook | 44 |
| blackspotted | 40 |
| lake | 43 |
| Loch Leven | 43 |
| rainbow | 31 |
| steelhead | 31 |
| Sunapee | 80 |
| Warmouth bass | 85 |
| White bass | 109 |
| White perch | 110 |
| Whitefish | 29 |
| Yellow bass | 110 |
| Yellow perch | 107 |

# THE DISTRIBUTION OF FISH AND FISH EGGS DURING THE FISCAL YEAR 1910.

## CHARACTER OF THE WORK.

More than 95 per cent of the output of the fish-cultural stations consists of important commercial species, notably the salmons, shad, whitefish, pike perch, yellow perch, white perch, lake trout, cod, pollock, flatfish, and lobsters. These are hatched in lots of many millions annually and planted by the Bureau, the fresh-water species principally in the large coastal streams and in the Great Lakes, the marine species upon the inshore fishing grounds of the Atlantic.

The cultivation of the fishes of the interior waters generally classed as game fishes, although a comparatively small factor in the total output, is a very important feature of the Bureau's work, supplying as it does various kinds of young fish for public streams, lakes and ponds, fishing preserves, private ponds, streams, etc., in all parts of the United States. Among the fishes most extensively cultivated for these purposes are the landlocked salmon, several species of trout, the grayling, the basses, crappie, bream, and catfish; various others also are handled. The trouts are artificially hatched from eggs taken from both wild and domesticated stock; the basses, catfish, and others are derived from mature fish held in ponds for breeding purposes, or (except the small-mouth black bass) they are rescued from the overflows of the Mississippi and Illinois Rivers. Collections from the latter sources include also pike and pickerel, which are not distributed to applicants but are returned immediately to the main streams.

## METHOD OF DISTRIBUTION.

The first consideration in the Bureau's distribution of fishes is to make ample return to the waters from which eggs or fish have been collected. The remainder of the product is consigned to suitable public or private waters upon application indorsed by a United States Senator or Representative, the Bureau furnishing to persons interested an application blank for this purpose. The blank calls for a description of the waters to be stocked, and by this information is determined the species of fish that is suitable and the number that may be allotted to the water area in question. Certain predaceous species, such as the basses, perches, and pickerel, are not furnished

for waters inhabited by trout or other valuable fishes to which they would be destructive. Nor, of course, are species like trout and salmon furnished for waters already stocked with fish that would prey upon them.

The fish are carried to their destination in railroad cars equipped for the purpose, or by messengers who accompany the shipments in baggage cars, and are delivered to the applicant free of charge, at the railroad station nearest the point of deposit. The applicant is advised by telegraph when the shipment will arrive, and is expected to make due provision for care of the fish until planted. Definite instructions in this respect are furnished at the time of shipment.

During the past fiscal year (July 1, 1909, to June 30, 1910) the Bureau received 10,635 applications for fish, nearly all for the game species. The demand, especially for the basses, crappie, and the catfishes, has for some time been greater than could be met with available resources. The number of applications this year was 523 more than in 1909.

## SIZE OF FISH WHEN DISTRIBUTED.

Fishes are distributed at various stages of development, according to the species, the numbers in the hatcheries, and the facilities for rearing. The commercial fishes—such as the shad, whitefish, lake trout, pike perch, cod, etc., hatched in lots of many millions—are necessarily planted as fry shortly after hatching. Atlantic salmon, landlocked salmon, and various species of trout are reared, in such numbers as the hatchery facilities permit, to fingerlings from 1 to 6 inches in length; the remainder are distributed as fry.[a]

The basses, bream, and other sunfishes are distributed from some three weeks after they are hatched until they are several months of age. When the last lots are shipped the basses usually range from 4 to 6 inches and the sunfishes from 2 to 4 inches in length. The numerous fishes collected in overflowed lands—basses, crappie, sunfishes, catfishes, yellow perch, and others—are 2 to 6 inches in length when taken and distributed.

Eggs are distributed only to state hatcheries and, occasionally, to applicants who have hatchery facilities.

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[a] The varying usage in the classification of young fish as to size has caused such confusion and difficulty that the Bureau has adopted uniform definitions, as follows:

*Fry*=fish up to the time the yolk sac is absorbed and feeding begins.

*Advanced fry*=fish from the end of the fry period until they have reached a length of 1 inch.

*Fingerlings*=fish between the length of 1 inch and the yearling stage, the various sizes to be designated as follows: No. 1, a fish 1 inch in length and up to 2 inches; no. 2, a fish 2 inches in length and up to 3 inches; No. 3, a fish 3 inches in length and up to 4 inches, etc.

*Yearlings*=fish that are 1 year old, but less than 2 years old from the date of hatching; these may be designated No. 1, No. 2, No. 3, etc., after the plan prescribed for fingerlings.

## SIZE OF ALLOTMENTS.

The Bureau does not attempt to furnish to any one applicant more than a brood stock of fish for a given private pond or stream, it being expected that these will be protected until they have had time to reproduce. The number of fish in an allotment is, however, a variable quantity, depending upon the species and the age at which distributed. Brook trout, which are distributed both as fry and fingerlings, are allotted in much larger numbers as fry than as fingerlings 3 or 4 inches long. Pike perch, which, owing to their excessive cannibalism, can not be reared and are consequently distributed as fry, may be supplied in lots of half a million, where an equal water area would receive only 200 or 300 young bass from 2 to 5 inches long. These latter larger fish have a much better chance of reaching maturity than have the fry, and the actual value for stocking purposes of a few hundred fingerling bass may therefore equal many thousand times this number of pike perch fry.

## SPECIES CULTIVATED IN 1910.

The species cultivated by the Bureau in 1910 numbered some 50 fishes and the lobster. Of these the following were artificially propagated:

THE CATFISHES (SILURIDÆ):

Horned pout, bullhead, yellow cat (*Ameiurus nebulosus*).
Marbled cat (*Ameiurus nebulosus marmoratus*).

THE SHADS AND HERRINGS (CLUPEIDÆ):

Shad (*Alosa sapidissima*).

THE SALMONS, TROUTS, WHITEFISHES, ETC. (SALMONIDÆ):

Common whitefish (*Coregonus albus* and *C. clupeaformis*).
Lake herring, cisco (*Leucichthys artedi*).
Chinook salmon, king salmon, quinnat salmon (*Oncorhynchus tschawytscha*).
Silver salmon, coho (*Oncorhynchus kisutch*).
Blueback salmon, redfish, sockeye (*Oncorhynchus nerka*).
Humpback salmon (*Oncorhynchus gorbuscha*).
Steelhead trout, hardhead (*Salmo gairdneri*).
Rainbow trout (*Salmo irideus*).
Atlantic salmon (*Salmo salar*).
Landlocked salmon (*Salmo sebago*).
Blackspotted trouts: Yellowstone Lake trout or cutthroat trout (*Salmo lewisi*); Colorado River trout (*Salmo pleuriticus*); Tahoe trout (*Salmo henshawi*).
Loch Leven trout (*Salmo trutta levensis*). Introduced species, propagated in limited numbers for observation.
Lake trout, Mackinaw trout, longe, togue (*Cristivomer namaycush*).
Brook trout, speckled trout (*Salvelinus fontinalis*).
Sunapee trout (*Salvelinus aureolus*).

THE GRAYLINGS (THYMALLIDÆ):

Montana grayling (*Thymallus montanus*).

THE SMELTS (ARGENTINIDÆ):

American smelt (*Osmerus mordax*).

THE BASSES, SUNFISHES, AND CRAPPIES (CENTRARCHIDÆ):
Crappie (*Pomoxis annularis*).
Strawberry bass, calico bass (*Pomoxis sparoides*).
Rock bass, red-eye, goggle-eye (*Ambloplites rupestris*).
Warmouth, goggle-eye (*Chænobryttus gulosus*).
Small-mouth black bass (*Micropterus dolomieu*).
Large-mouth black bass (*Micropterus salmoides*).
Bluegill bream, bluegill sunfish (*Lepomis pallidus*).
Other sunfishes, chiefly *Eupomotis gibbosus*.
THE PERCHES (PERCIDÆ):
Pike perch, wall-eyed pike, yellow pike, blue pike (*Stizostedion vitreum*).
Yellow perch, ring perch (*Perca flavescens*).
THE SEA BASSES (SERRANIDÆ):
Sea bass (*Centropristes striatus*).
Striped bass, rockfish (*Roccus lineatus*).
White bass (*Roccus chrysops*).
White perch (*Morone americana*).
Yellow bass (*Morone interrupta*).
THE MACKERELS (SCOMBRIDÆ):
Mackerel (*Scomber scombrus*).
THE CODS (GADIDÆ):
Cod (*Gadus callarias*).
Haddock (*Melanogrammus æglefinus.*)
Pollock (*Pollachius virens*).
THE FLOUNDERS (PLEURONECTIDÆ):
Winter flounder, American flatfish (*Pseudopleuronectes americanus*).
CRUSTACEANS:
American lobster (*Homarus americanus*).

After the annual seasons of high water in the Mississippi basin, great numbers of young fish are left in sloughs and pools when the waters have receded, and would eventually die by the drying up of these shallow places in summer or freezing in winter. Large collections are made from such sources, for return to the original stream and, of the most abundant species, also to supplement the hatchery stock for distribution. The fishes so collected in 1910 were as follows:

THE CATFISHES (SILURIDÆ):
Spotted cat, blue cat, channel cat (*Ictalurus punctatus*). Only limited numbers obtainable.
Horned pout, bullhead, yellow cat (*Ameiurus nebulosus*).
THE SUCKERS AND BUFFALOFISHES (CATOSTOMIDÆ):
Small-mouth buffalofish (*Ictiobus bubalus*).
THE MINNOWS AND CARPS (CYPRINIDÆ):
Carp (*Cyprinus carpio*). Distributed in rare instances, for waters unsuited to other species.
THE PIKES AND PICKERELS (ESOCIDÆ):
Pike (*Esox lucius*). Restored to the streams; not distributed.
Pickerel (*Esox reticulatus*). Restored to the streams; not distributed.
THE BASSES, SUNFISHES, AND CRAPPIES (CENTRARCHIDÆ):
Crappie (*Pomoxis annularis*).
Rock bass, red-eye, goggle-eye (*Ambloplites rupestris*).
Warmouth, goggle-eye (*Chænobryttus gulosus*).
Large-mouth black bass (*Micropterus salmoides*).

THE BASSES, SUNFISHES, AND CRAPPIES (CENTRARCHIDÆ)—Continued.
Small-mouth black-bass (*Micropterus dolomieu*).
Bluegill bream, bluegill sunfish (*Lepomis pallidus*).
Other sunfishes (chiefly *Eupomotis gibbosus*).
THE PERCHES (PERCIDÆ):
Yellow perch, ring perch (*Perca flavescens*).
THE CROAKERS (SCIÆNIDÆ):
Fresh-water drum, sheepshead, gaspergou (*Aplodinotus grunniens*). Only limited numbers obtainable. Not distributed.

Certain introduced species are propagated to a limited extent, as follows:

THE MINNOWS AND CARPS (CYPRINIDÆ):
Goldfish (*Carassius auratus*). Propagated for ornamental purposes; not distributed.
Ide (*Leuciscus idus*). Cultivated variety, golden ide. Propagated for ornamental purposes; not distributed.

## OUTPUT.

Although unfavorable climatic conditions, in 1910, prevented the collection of as large numbers of eggs as usual, the superior quality obtained from the most important species made possible a 4 per cent increase over the previous record year of 1909. As appears in the Report of the Commissioner of Fisheries for 1910, this year's output of the stations was something over 473,000,000 eggs, 2,720,000,000 fry, and 36,000,000 fingerlings, yearlings, and adults, or more than 3,230,000,000 fish and eggs in all. The yield of the various species showed the usual fluctuations, there being notable increases in the blueback, silver, and Atlantic salmons, lake trout, lake herring, yellow perch, shad, cod, flatfish, and steelhead trout, offset to some extent by decreases in chinook salmon, whitefish, pike perch, and less important fishes.

The following table shows the work of the different stations in 1910, the period of operation, and the eggs and fish delivered by each station for distribution. It will be noted that transfers of eggs and fish from station to station are frequent, serving economy and convenience in transportation where the shipment consists of eggs, and giving advantageous distributing centers in the case of young fish. Transfers are in all cases credited to the receiving station in the column of totals, but for completeness of information are recorded opposite both shipping and receiving station in the columns headed "Transfers." The purpose of this table is to be distinguished from that of the summary of distributions on page 25 of this report, which is a statement of the number of eggs and fish actually delivered at their destination, all losses in shipment being deducted.

STATIONS OPERATED AND THE

NOTE.—The relative importance of the stations is in a degree indicated in the table by marginal indentions haps shifting in location from year to year. At all other substations eggs were both collected and hatched. stations to which they are, for administration purposes, subordinate; but it is not always possible to show

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| Afognak, Alaska | Blueback salmon | | | |
| Entire year. | Humpback salmon | | | |
| Baird, Cal | Chinook salmon | 7,331,217 | Nashua, 100,000 | |
| Entire year. | | | Central station, 15,000. | |
| | Rainbow trout | 13,680 | | |
| | Brook trout | | | Leadville, 25,000 |
| Battle Creek Cal | Chinook salmon | 7,358,800 | | |
| Oct.–Jan. | | | | |
| Derby, Nev | Blackspotted trout | 438,550 | | |
| Jan.–May. | Rainbow trout | 100,000 | | |
| Mill Creek, Cal | Chinook salmon | 15,849,450 | | |
| Oct.–Jan. | | | | |
| Baker Lake, Wash | Silver salmon | 100,000 | | |
| Entire year. | Chinook salmon | | | |
| | Blueback salmon | 100,000 | | |
| | Steelhead trout | | | |
| Birdsview, Wash | Humpback salmon | | | |
| Entire year. | Silver salmon | 275,000 | | |
| | Steelhead trout | 300,000 | Cape Vincent, 25,000 | |
| | | | Spearfish, 25,000 | |
| | Chinook salmon | | | Illabott Creek, 431,740 |
| *Day Creek, Wash* | Steelhead trout | | Birdsview, 769,000 | |
| Feb.–June. | | | | |
| Illabott Creek, Wash. | Chinook salmon | 439,990 | Birdsview, 431,740 | |
| July–Oct. | | | | |
| *Salmon Banks, San Juan Island, Wash.* | Blueback salmon | | | |
| July–Oct. | | | | |
| Battery, Havre de Grace, Md. | Yellow perch | 5,200,000 | | |
| | White perch | 16,500,000 | | |
| Feb. 27–May 25. | Shad | 800,000 | | |
| | Striped bass | | | |
| Boothbay Harbor, Me | Lobster | 780,000 | | |
| Entire year. | Flatfish | | | |
| | Cod | | | |
| | Haddock | | | |
| *Portland, Me* | Lobster | | | |
| July 1–Jan. 1. | | | | |
| *York, Me* | do | | | |
| July 1–Oct. 31. | | | | |
| Bozeman, Mont | Brook trout | | | |
| Entire year. | Blackspotted trout | | | Spearfish, 544,000 |
| | Rainbow trout | 85,000 | Clackamas, 85,000 | |
| | Grayling | 25,000 | | |
| | Landlocked salmon | | | |
| | Lake trout | | | |
| | Steelhead trout | | | |
| *Grayling, Mont* | Rainbow trout | | | |
| Mar. 1–June 30. | Grayling | | | |
| *Soda Butte, National Park, Mont.* | Blackspotted trout | | | |
| June 16–20. | | | | |
| Bryans Point, Md | Yellow perch | 4,030,000 | Central Station, 4,030,000. | |
| Feb. 21–May 23. | | | | |
| | Shad | 1,077,000 | Central Station, 1,077,000. | |
| Cape Vincent, N. Y. | Steelhead trout | | | Birdsview, 25,000 |
| Entire year. | Whitefish | | | Put-in-Bay, 25,000,000 |
| | Brook trout | | | |
| | Lake trout | | | Duluth, 5,100,000 |
| | Pike perch | | | Put-in Bay, 5,000,000 |
| | Landlocked salmon | | | Grand Lake Stream, 15,000. |
| | Rainbow trout | | | Wytheville, 50,000 |
| | Yellow perch | | | |

## Output of Each, 1910.

and italic type, the italics being used to denote substations which were merely collecting points, per- It should be added that some substations are more important in the actual fish-cultural work than the the output of these important substations separate from that of the main hatchery.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| 68,422,170 | | | | | | 68,422,170 |
| 363,740 | | | | | | 363,740 |
| 2,286,257 | | | | | | 9,502,474 |
| | | | | | | 13,680 |
| 24,165 | | | | | | 24,165 |
| | | | | | | 7,358,800 |
| 718,020 | | | | | | 1,156,570 |
| | | | | | | 100,000 |
| | | | | | | 15,849,450 |
| 5,808,848 | | | | | | 5,908,848 |
| 149,570 | | | | | | 149,570 |
| 4,554,825 | | | | | | 4,654,825 |
| 14,400 | | | | | | 14,400 |
| 1,368,000 | | | | | | 1,368,000 |
| 5,079,177 | | | | | | 5,354,177 |
| 1,422,938 | | | | | | |
| | | | | | | 1,672,938 |
| 705,840 | | | | | | 705,840 |
| | | | | | | |
| | | | | | | 8,250 |
| | | | | | | |
| 120,300,000 | | | | | | 125,500,000 |
| 338,480,000 | | | | | | 354,980,000 |
| 5,391,000 | | | | | | 6,191,000 |
| 115,000 | | | | | | 115,000 |
| 128,106,000 | | | 2,052 | | | 128,888,052 |
| 402,165,000 | | | | | | 402,165,000 |
| 14,888,000 | | | | | | 14,888,000 |
| 712,000 | | | | | | 712,000 |
| | | | | | | |
| | | | | | | |
| | | | 353,818 | | | 353,818 |
| | | | 351,006 | | | 351,006 |
| 23,000 | | | 48,518 | | | 71,518 |
| 81,000 | | | 18 | | | 106,018 |
| | | | 17,000 | | | 17,000 |
| | | | 28,900 | | | 28,900 |
| | | | 18,718 | | | 18,718 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 200,285,000 | | | | | | 200,285,000 |
| 31,065,000 | | | | | | 31,065,000 |
| 46,761 | | | | | | 46,761 |
| 20,170,000 | | | | | | 20,170,000 |
| 941,500 | | | | | | 941,500 |
| 4,852,000 | | | | | | 4,852,000 |
| 4,800,000 | | | | | | 4,800,000 |
| 14,500 | | | | | | 14,500 |
| 38,000 | | | | | | 38,000 |
| 1,600,000 | | | | | | 1,600,000 |

STATIONS OPERATED AND THE

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| Central Station, Washington, D. C. Entire year. | Sunfish | | | |
| | Crappie | | | |
| | Catfish | | | |
| | Smelt | | | |
| | Warmouth bass | | | |
| | Rock bass | | | |
| | Small-mouth black bass. | | | |
| | Large-mouth black bass. | | | |
| | Rainbow trout | | | Wytheville, 15,000 |
| | Steelhead trout | | | |
| | Chinook salmon | | | Baird, 15,000 |
| | Yellow perch | | | Bryans Point, 4,030,000 |
| | Pike perch | | | Put-in Bay, 6,000,000 |
| | Brook trout | | | St. Johnsbury, 20,000 |
| | Whitefish | | | Put-in Bay, 640,000. Detroit, 500,000. |
| | Shad | | | Bryans Point, 1,077,000 |
| Clackamas, Oregon City, Oreg. Entire year. | Rainbow trout | | | Bozeman, 85,000 |
| | Brook trout | | | Leadville, 100,000 |
| | Steelhead trout | | | Eagle Creek, 75,000 |
| | Blackspotted trout | | | Spearfish, 100,000 |
| | Lake trout | | | |
| | Chinook salmon | 150,000 | | Rogue River, 61,600 |
| Big White Salmon, Wash. Aug. 1–Feb. 28. | do | | | |
| Cazadero, Oreg. | Steelhead trout | | | Eagle Creek, 410,000 |
| | Chinook salmon | 2,152,000 | | |
| Eagle Creek, Clackamas River, Oreg. Mar. 15–June 25. | Steelhead trout | 485,000 | Cazadero, 410,000. Clackamas, 75,000. | |
| Eagle and Tanner Creeks, Oreg. Aug. 1–Oct. 1. | Chinook salmon | 269,300 | | |
| *Illinois River, Oreg.* Aug. 1–Apr. 30. | do | 14,200 | Rogue River, 14,200. | |
| Little White Salmon, Wash. Entire year. | do | 3,805,000 | | |
| Rogue River, Oreg. Entire year. | do | 484,000 | Clackamas, 61,600 | Illinois River, 14,200 |
| | Steelhead trout | | | |
| Wil'amette, Oreg. Jan. 1–July 15. | Shad | | | |
| *Bybee Bridge, Rogue River, Oreg.* Aug. 1–Nov. 1. | Chinook salmon | | | |
| Cold Springs, Bullochville, Ga. Entire year. | Large-mouth black bass. | | | |
| | Sunfish | | | |
| | Catfish | | | |
| | Warmouth bass | | | |
| | Rock bass | | | |
| Craig Brook, East Orland, Me. Entire year. | Brook trout | | | St. Johnsbury, 5,000 |
| | Atlantic salmon | 1,345,000 | Upper Penobsco t, Me., 1,340,000. | |
| Upper Penobscot, Me. Oct. 15–June 1. | do | | | Craig Brook, 1,340,000. |
| Duluth, Minn. Entire year. | Landlocked salmon. | | | Grand Lake Stream, 15,000. |
| | Brook trout | | | |
| | Whitefish | | | Detroit, 25,000,000 |
| | Pike perch | | | Put-in Bay, 15,000,000. |
| | Steelhead trout | | | |
| | Lake trout | 5,425,000 | Cape Vincent, 5,100,000 Green Lake, 125,000. | Northville, 5,000,000 |
| *Grand Marais, Mich.* Oct. 16–Nov. 18. | do | | | |
| *Grand Marais, Minn.* Sept. 19–Nov. 26. | do | | | |
| *Grand Portage, Minn.* Sept. 24–Oct. 15. | do | | | |
| *Keweenaw Point, Mich.* Oct. 4–Nov. 2. | do | | | |
| *Marquette, Mich.* Oct. 16–Nov. 11. | do | | | |

OUTPUT OF EACH, 1910—Continued.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| | | | 5,600 | | | 5,600 |
| | | | 247 | | | 247 |
| | | | 450 | | | 450 |
| | | | 9,000 | | | 9,000 |
| | | | 752 | | | 752 |
| | | | 2,010 | | | 2,010 |
| | | | 1,000 | | | 1,000 |
| | | | 440 | | | 440 |
| 7,000 | | | | | | 7,000 |
| 12,000 | | | | | | 12,000 |
| | | | 10,000 | | Nashua, 10,000 | 10,000 |
| 3,700,000 | | | | | | 3,700,000 |
| 5,000,000 | | | | | | 5,000,000 |
| 18,700 | | | | | | 18,700 |
| 774,000 | | | | | | 774,000 |
| 977,000 | | | | | | 977,000 |
| 51,116 | | | | | | 51,116 |
| 64,800 | | | | | | 64,800 |
| 126,000 | | | | | | 126,000 |
| 82,214 | | | 1,418 | | | 83,632 |
| 12,000 | | | | | | 12,000 |
| 3,686,200 | | | 225 | | | 3,836,425 |
| 3,512,200 | | | | | | 3,512,200 |
| 1,808,835 | | | | | | 1,808,835 |
| 534,197 | | | | | | 2,986,197 |
| 49,503 | | | | | | 49,503 |
| | | | | | | 269,300 |
| 4,808,000 | | | | | | 8,613,000 |
| 660,292 | | | | | | 1,082,692 |
| 89,850 | | | | | | 89,850 |
| 1,678,000 | | | | | | 1,678,000 |
| | | | | | | |
| | | | 107,850 | | | 107,850 |
| | | | 7,080 | | | 7,080 |
| | | | 100 | | | 100 |
| | | | 40 | | | 40 |
| | | | 100 | | | 100 |
| 196,000 | | | 76,550 | Nashua, 2,200 | | 272,550 |
| 155,799 | | | 82,413 | | | 243,212 |
| 1,217,366 | | | | | | 1,217,366 |
| | | | 11,400 | | | 11,400 |
| | | | 370,000 | | | 370,000 |
| 25,000,000 | | | | | | 25,000,000 |
| 13,800,000 | | | | | | 13,800,000 |
| | | | 161,000 | | | 161,000 |
| 8,825,000 | | | 4,246,500 | | | 13,271,500 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

STATIONS OPERATED AND THE

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| Duluth, Minn.—Cont'd. | | | | |
| *Munising, Mich.* Oct. 16–Nov. 12. | Lake trout | | | |
| *Ontonagon, Mich.* Oct. 16–Nov. 13. | do | | | |
| *Two Harbors, Minn.* Oct. 15–Nov. 1. | do | | | |
| Edenton, N. C. Jan. 2–June 30. | Shad | 1,360,000 | | |
| Weldon, N. C. Apr. 1–May 30. | Striped bass | 4,566,000 | | |
| Erwin, Tenn. Entire year. | Small-mouth black bass. | | | |
| | Large-mouth black bass. | | | |
| | Brook trout | | | |
| | Rainbow trout | | | Wytheville, 503,000. |
| | Catfish | | | |
| | Yellow perch | | | |
| | Sunfish | | | |
| | Rock bass | | | |
| Gloucester, Mass. Entire year. | Lobster | | | |
| | Pollock | | | |
| | Cod | 34,689,000 | Woods Hole, 24,835,000 | |
| | Flatfish | | | |
| Green Lake, Me. Entire year. | Landlocked salmon. | 55,000 | St. Johnsbury, 5,000 | Grand Lake Stream, 704,799. |
| | Brook trout | 25,000 | | |
| | Smelt | 4,500,000 | | |
| | Lake trout | | | Duluth, 100,000. Northville, 300,000. |
| *Branch Pond, Me.* Sept. 13–Nov. 30. | Landlocked salmon. | | | |
| Grand Lake Stream, Me. Entire year. | Landlocked salmon. | 824,799 | Duluth, 15,000 | |
| | | | Spearfish, 25,000. | |
| | | | Cape Vincent, 15,000. | |
| | | | Green Lake, 704,799. | |
| Leadville, Colo. Entire year. | Brook trout | 605,000 | Baird, 25,000. | |
| | | | Clackamas, 100,000. | |
| | Rainbow trout | 55,000 | Manchester, 10,000 | |
| | Lake trout | | | |
| | Blackspotted trout | 235,000 | | |
| *Cheesman Lake, Colo.* Apr. 6–May 8. | Rainbow trout | | | |
| *Darrah Lake, Colo.* Nov. 11–Nov. 30. | Brook trout | | | |
| *Edith Lake, Colo.* Oct. 18–Nov. 28. | do | | | |
| *Engelbrecht Lake, Colo.* Oct. 16–Nov. 12. | do | | | |
| *Grand Mesa Lakes, Colo.* | Blackspotted trout | | | |
| | Rainbow trout | | | |
| July 1–Aug. 1. | Brook trout | | | |
| Oct. 25–Nov. 11. | | | | |
| *Musgroves Lake, Colo.* Oct. 12–Dec. 6. | do | | | |
| *Woodbridge, Colo.* Nov. 27–Dec. 3. | do | | | |
| Mammoth Spring, Ark. Entire year. | Large-mouth black bass. | | | |
| | Small-mouth black bass. | | | |
| | Rainbow trout | | | |
| | Rock bass | | | |
| *Des Arc, Ark.* Mar. 4–May 7. | White bass | | | |
| *Helena, Ark.* Aug. 24–Dec. 29. | Catfish | | | |
| | Buffalo fish | | | |
| | Rock bass | | | |
| | Pike perch | | | |
| | Fresh-water drum | | | |
| | Sunfish | | | |
| | Crappie | | | |
| | Large-mouth black bass. | | | |
| | Yellow bass | | | |
| | White bass | | | |

OUTPUT OF EACH, 1910—Continued.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 48,262,000 | | | | | | 49,622,000 |
| 2,669,000 | | | | | | 7,235,000 |
| | | | 700 | | | 700 |
| 17,600 | | | 4,860 | | | 22,460 |
| | | | 233,600 | | | 233,600 |
| | | | 490,780 | | | 490,780 |
| | | | 230 | | | 230 |
| | | | 1,450 | | | 1,450 |
| | | | 18,535 | | | 18,535 |
| | | | 3,860 | | | 3,860 |
| 16,900,000 | | | | | | 16,900,000 |
| 38,140,000 | | | | | | 38,140,000 |
| 134,053,000 | | | | | | 143,907,000 |
| 312,820,000 | | | | | | 312,820,000 |
| 586,100 | | | 237,264 | | | 873,364 |
| 1,001,500 | | | | | | 1,026,500 |
| | | | | | | 4,500,000 |
| 351,922 | | | | | | 351,922 |
| | | | | | | |
| | | | | | | 468,640 |
| 381,440 | | | 22,200 | | | |
| 2,612,880 | | | 379,640 | | | 3,472,520 |
| 325,600 | | | 217,625 | | | 588,225 |
| 24,700 | | | | | | 24,700 |
| 565,600 | | | 37,000 | | | 837,600 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
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| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | 1,400 | | | 1,400 |
| | | | 82,510 | | | 82,510 |
| | | | 200 | | | 200 |
| | | | 4,300 | | | 4,300 |
| | | | | | | |
| | | | 21,540 | | | 21,540 |
| | | | 178,675 | | | 178,675 |
| | | | 10,215 | | | 10,215 |
| | | | 800 | | | 800 |
| | | | 8,950 | | | 8,950 |
| | | | 85,365 | | | 85,365 |
| | | | 177,010 | | | 177,010 |
| | | | 18,230 | Tupelo, 1,600 | | 18,230 |
| | | | 250 | | | 250 |
| | | | 5,950 | | | 5,950 |

STATIONS OPERATED AND THE

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| Manchester, Iowa. Entire year. | Rock bass | | | |
| | Pike perch | | | Put-in Bay, 3,500,000. |
| | Brook trout | | | |
| | Lake trout | | | |
| | Rainbow trout | 125,650 | | Leadville, 10,000. |
| | Small-mouth black bass. | | | |
| *La Crosse, Wis.*[a] July 15–Oct. 19. | Sunfish | | | |
| | Yellow perch | | | |
| | Large-mouth black bass. | | | |
| | Catfish | | | |
| | Pickerel | | | |
| | Crappie | | | |
| | Carp | | | |
| | Buffalofish | | | |
| | Pike | | | |
| | Pike perch | | | |
| | White bass | | | |
| *North McGregor, Iowa.*[a] July 15–Oct. 6. | Crappie | | | |
| | Sunfish | | | |
| | Large-mouth black bass. | | | |
| | Catfish | | | |
| | Yellow perch | | | |
| | Carp | | | |
| | Pike | | | |
| | Fresh-water drum | | | |
| Nashua, N. H. Entire year. | Small-mouth black bass. | | | |
| | Sunapee trout | | | |
| | Brook trout | | | |
| | Chinook salmon | | | Baird, 100,000. |
| | Rainbow trout | | | Wytheville, 50,000. |
| *Lake Sunapee, N. H.* Oct. 13–Nov. 22. | Brook trout | | | |
| | Sunapee trout | | | |
| | Landlocked salmon | | | |
| Neosho, Mo. Entire year. | Rainbow trout | 41,264 | | |
| | Large-mouth black bass. | | | |
| | Rock bass | | | |
| | Crappie | | | |
| | Carp | | | |
| | Yellow perch | | | |
| | Pike perch | | | Put-in Bay, 1,800,000. |
| Northville, Mich. Entire year. | Small-mouth black bass. | | | |
| | Brook trout | | | |
| | Rainbow trout | | | Wytheville, 100,000. |
| | Lake trout | 34,894,000 | Duluth, 5,000,000. Green Lake, 300,000. Sault Ste. Marie, 5,000,000. Alpena, 4,000,000. Charlevoix, 10,584,000. | Charlevoix, 3,066,560. |
| Alpena, Mich. Feb. 23–May 4. | Lake trout | | | Northville, 4,000,000. |
| | Whitefish | | | Detroit, 15,000,000. |
| *Bay City, Mich.* Apr. 1–Apr. 29. | Pike perch | | | |
| *Belle Isle, Mich.* Oct. 25–Dec. 12. | Whitefish | | | |
| Charlevoix, Mich. Oct. 20–Dec. 21. Feb. 28–May 4. | Lake trout | 3,066,560 | Northville, 3,066,560. | Northville, 10,584,000. |
| | Whitefish | | | Detroit, 15,000,000. |
| *Cheboygan, Mich.* Oct. 18–Nov. 15. | Lake trout | | | |
| *Detour, Mich.* Oct. 15–Nov. 10. | do | | | |

[a] Station for the collection of fishes from overflowed lands.

OUTPUT OF EACH, 1910—Continued.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| | | | 8,300 | | | 8,300 |
| 3,300,000 | | | | | | 3,300,000 |
| | | | 866,500 | | | 866,500 |
| | | | 3,880 | | | 3,880 |
| | | | 85,700 | | | 211,350 |
| | | | 9,695 | | | 9,695 |
| | | | 53,875 | | | 53,875 |
| | | | 10,320 | | | 10,320 |
| | | | 77,025 | | | 77,025 |
| | | | 111,500 | | | 111,500 |
| | | | 500 | | | 500 |
| | | | 102,820 | | | 102,820 |
| | | | 22,300 | | | 22,300 |
| | | | 22,800 | | | 22,800 |
| | | | 39,500 | | | 39,500 |
| | | | 4,460 | | | 4,460 |
| | | | 100 | | | 100 |
| | | | 95,125 | | | 95,125 |
| | | | 136,100 | | | 136,100 |
| | | | 162,025 | | | 162,025 |
| | | | 384,700 | | | 384,700 |
| | | | 84,700 | | | 84,700 |
| | | | 115 | | | 115 |
| | | | 3,800 | | | 3,800 |
| | | | 3,000 | | | 3,000 |
| 21,600 | | | | | | 21,600 |
| 171,029 | | | | | | 171,029 |
| 788,000 | | | | | | 788,000 |
| | | St. Johnsbury, 104,000. | | | Craig Brook, 2,200. | |
| | | | 57,300 | | Central Station, 10,000. | 57,300 |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 168,500 | | | 52,855 | | | 262,619 |
| | | | 11,650 | | | 11,650 |
| | | | 30,025 | | | 30,025 |
| | | | 12,950 | | | 12,950 |
| | | | 115 | | | 115 |
| | | | 50 | | | 50 |
| 1,400,000 | | | | | | 1,400,000 |
| 162,000 | | | 14,000 | | | 176,000 |
| 426,000 | | | 106,200 | | | 532,200 |
| 500 | | | 82,000 | | | 82,500 |
| | | | 3,500 | | | 10,013,500 |
| 4,000,000 | | | | | | 4,000,000 |
| 15,000,000 | | | | | | 15,000,000 |
| | | | | | | |
| | | | | | | |
| 10,584,000 | | | | | | 10,584,000 |
| 15,000,000 | | | | | | 15,000,000 |
| | | | | | | |
| | | | | | | |

STATIONS OPERATED AND THE

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| Northville, Mich.—Con. | | | | |
| Detroit, Mich. Entire year. | Whitefish | 74,500,000 | Central Station, 500,000. Duluth, 20,000,000. Sault Ste. Marie, 20,000,000. Alpena, 15,000,000. Charlevoix, 15,000,000. | |
| | Pike perch | 34,280,000 | | |
| *Fairport, Mich.* Oct. 20–Nov. 23. | Lake trout | | | |
| *Grand Haven, Mich.* Nov. 6–Nov. 18. | do | | | |
| *Grassy Island, Mich.* Oct. 25–Dec. 12. | Whitefish | | | |
| *Naubinway, Mich.* Nov. 15–Nov. 24. | do | | | |
| *Northport, Mich.* Oct. 26–Nov. 18. | Lake trout | | | |
| *Port Huron, Mich.* May 1–May 20. | Pike perch | | | |
| *St. James, Mich.* Nov. 1–Nov. 24. | Lake trout | | | |
| Sault Ste. Marie, Mich. Feb. 20–May 21. | Whitefish | | | Detroit, 20,000,000. |
| | Lake trout | | | Northville, 5,000,000. |
| *Manistique, Mich.* Oct. 15–Nov. 22. | do | | | |
| Put-in Bay, Ohio. Entire year. | Pike perch | 324,475,000 | Duluth, 15,000,000. Central Station, 6,000,000. Neosho, 1,800,000. Meredosia, 5,000,000. Wytheville, 1,000,000. Manchester, 3,500,000. Cape Vincent, 5,000,000. | |
| | Whitefish | 77,068,000 | Cape Vincent, 25,000,000. Central Station, 640,000. | |
| | Lake herring | 1,440,000 | | |
| *Kelleys Island, Ohio.* Nov. 10–Nov. 23. | Whitefish | | | |
| *Middle Bass, Ohio.* Nov. 7–Dec. 3. | do | | | |
| *Monroe, Mich.* Nov. 1–Nov. 28. Apr. 1–Apr. 20. | do | | | |
| | Pike perch | | | |
| *North Bass Island, Ohio.* Nov. 5–Dec. 3. Apr. 16–28. | Whitefish | | | |
| | Pike perch | | | |
| *Port Clinton, Ohio.* Nov. 3–Dec. 2. Apr. 3–May 7. | Whitefish | | | |
| | Pike perch | | | |
| *Toledo, Ohio.* Apr. 1–May 11. | do | | | |
| Quincy, Ill. Entire year. | | | | |
| Meredosia, Ill.[a] July–Dec. | Crappie | | | |
| | Carp | | | |
| | Large-mouth black bass. | | | |
| | Catfish | | | |
| | Yellow perch | | | |
| | Sunfish | | | |
| | Pike perch | | | Put-in Bay, 5,000,000. |
| St. Johnsbury, Vt. Entire year. | Brook trout | 35,000 | Central Station, 20,000. Craig Brook, 5,000. | |
| | Small-mouth black bass. | | | |
| | Landlocked salmon. | | | Green Lake, 5,000. |
| | Yellow perch | | | |
| *Darling Pond, Vt.* Sept. 1–Dec. 21. | Brook trout | | | |
| *Hatch Pond, South Ryegate, Vt.* Aug. 9–Nov. 13. | do | | | |
| *Lake Mitchell, Vt.* Sept. 1–Dec. 17. | Brook trout | | | |

[a] Station for the collection of fishes from overflowed lands.

OUTPUT OF EACH, 1910—Continued.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| 25,000,000 | | | | | | 29,000,000 |
| 12,100,000 | | | | | | 46,380,000 |
| | | | | | | |
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| | | | | | | |
| | | | | | | |
| 20,000,000 | | | | | | 20,000,000 |
| 5,000,000 | | | | | | 5,000,000 |
| | | | | | | |
| 89,375,000 | | | | | | 376,550,000 |
| 75,020,000 | | | | | | 126,448,000 |
| 70,300,000 | | | | | | 71,740,000 |
| | | | | | | |
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| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | 20,100 | | | 20,100 |
| | | | 35 | | | 35 |
| | | | 108,045 | | | 108,045 |
| | | | 25,350 | | | 25,350 |
| | | | 9,055 | | | 9,055 |
| | | | 25,000 | | | 25,000 |
| 4,250,000 | | | | | | 4,250,000 |
| 1,661,000 | Holden,300,000. Nashua,104,000. | | 346 | | Holden, 31,425. | 1,267,346 |
| 140,000 | | | 2,550 | | | 142,550 |
| 4,800 | Holden, 1,800. | | | | Holden, 1,000. | 3,000 |
| | | | 3,595 | | | 3,595 |
| | | | | | | |
| | | | | | | |
| | | | | | | |

STATIONS OPERATED AND THE

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| St. Johnsbury, Vt.—Con. | | | | |
| Holden, Vt. | Brook trout | | | |
| July 1–Nov. 13. | | | | |
| Apr. 12–June 30. | Landlocked salmon. | | | |
| | Lake trout | | | |
| Swanton, Vt. | Pike perch | | | |
| Mar. 15–June 2. | Yellow perch | | | |
| San Marcos, Tex. | Sunfish | | | |
| Entire year. | Rock bass | | | |
| | Large-mouth black bass. | | | |
| | Crappie | | | |
| | Carp | | | |
| Spearfish, S. Dak. | Brook trout | | | |
| Entire year. | Landlocked salmon. | | | Grand Lake Stream, 25,000. |
| | Loch Leven trout | | | |
| | Blackspotted trout. | 2,719,000 | Clackamas, 100,000. Bozeman, 544,000. | |
| | Rainbow trout | | | Wytheville, 100,000. |
| | Steelhead trout | | | Birdsview, 25,000. |
| *Sand Creek, Beulah, Wyo.* | Brook trout | | | |
| Oct. 20–Jan. 15. | | | | |
| *Schmidt Lake, S. Dak.* | do | | | |
| Oct. 20–Dec. 31. | | | | |
| *Thumb of Lake, Yellowstone National Park, Wyo.* | Blackspotted trout. | | | |
| May 25–Aug. 1. | | | | |
| *Clear Creek, Yellowstone National Park, Wyo.* | do | | | |
| June 1–Aug. 10. | | | | |
| *Columbine Creek, Yellowstone National Park, Wyo.* | do | | | |
| June 1–Aug. 10. | | | | |
| *Cub Creek, Yellowstone National Park, Wyo.* | do | | | |
| June 1–Aug. 10. | | | | |
| Steamer Fish Hawk, Delaware River, Philadelphia, Pa. | Shad | | | |
| May 6–June 1. | | | | |
| Tupelo, Miss. | Sunfish | | | |
| Entire year. | Large-mouth black bass. | | | |
| | Crappie | | | |
| | Catfish | | | |
| White Sulphur Springs, W. Va. | Rainbow trout | 100,900 | | |
| | Brook trout | 1,000 | | |
| Entire year. | Large-mouth black bass. | | | |
| | Small-mouth black bass. | | | |
| | Blackspotted trout. | | | |
| Woods Hole, Mass. | Lobster | | | |
| Entire year. | Cod | | | Gloucester, 24,835,000. |
| | Mackerel | | | |
| | Flatfish | | | |
| | Sea bass | | | |
| *Chilmark, Mass.* | Lobster | | | |
| Oct. 1–Oct. 9. | | | | |
| *East Greenwich, Mass.* | Flatfish | | | |
| Mar. 1–Apr. 1. | | | | |
| *Gosnold, Mass.* | Lobster | | | |
| Sept. 16–Oct. 9. | | | | |
| May 23–June 23. | | | | |
| *Newport, R. I.* | Flatfish | | | |
| Mar. 10–Apr. 1. | | | | |

OUTPUT OF EACH, 1910—Continued.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| | | St. Johnsbury, 300,000. | 177,975 | St. Johnsbury, 31,425. | | 177,975 |
| | | St. Johnsbury, 1,800. | 3,500 | St. Johnsbury, 1,000. | | 3,500 |
| | | | 3,370 | | | 3,370 |
| 20,000,000 | | | | | | 20,000,000 |
| 1,000,000 | | | | | | 1,000,000 |
| | | | 4,130 | | | 4,130 |
| | | | 3,335 | | | 3,335 |
| | | | 138,239 | | | 138,239 |
| | | | 9,675 | | | 9,675 |
| | | | 25 | | | 25 |
| | | | 684,000 | | | 684,000 |
| | | | 12,000 | | | 12,000 |
| | | | 68,248 | | | 68,248 |
| | Bozeman,400,000 | | 514,750 | | | 2,989,750 |
| | | | 234,775 | | | 234,775 |
| | | | | | | |
| | | | | | | |
| | | | | | |

STATIONS OPERATED AND THE

| Station and period of operation. | Species. | Eggs. | | |
|---|---|---|---|---|
| | | Distributed. | Transfers to other stations. | Transfers from other stations. |
| Woods Hole, Mass.—Continued. | | | | |
| *Noank, Conn.* Sept. 29–Oct. 21. | Lobster | | | |
| *Plymouth, Mass.* Nov. 10–Mar. 22. | Cod | | | |
| *Sandwich, Mass.* May 3–June 23. | Lobster | | | |
| *Waquoit, Mass.* Jan. 20–Mar. 23. | Flatfish | | | |
| *Westport, Mass.* May 3–June 23. | Lobster | | | |
| *West Tisbury, Mass.* May 3–June 23. Oct. 1–Oct. 10. | do | | | |
| *Wickford, R. I.* Mar. 17–Apr. 1. | Flatfish | | | |
| Wytheville, Va. Entire year. | Large-mouth black bass. | | | |
| | Small-mouth black bass. | | | |
| | Rock bass | | | |
| | Yellow perch | | | |
| | Rainbow trout | 948,000 | Erwin, 503,000.<br>Cape Vincent, 50,000.<br>Nashua, 50,000.<br>Spearfish, 100,000.<br>Central Station, 15,000.<br>Northville, 100,000. | |
| | Brook trout | | | |
| | Carp | | | |
| | Pike perch | | | Put-in Bay, 1,000,000. |
| Yes Bay, Alaska. Entire year. | Blueback salmon | | | |
| Total output of Bureau. | | | | |

OUTPUT OF EACH, 1910—Continued.

| Fry. | | | Fingerlings, yearlings, and adults. | | | Total output. |
|---|---|---|---|---|---|---|
| Distributed. | Transfers to other stations. | Transfers from other stations. | Distributed. | Transfers to other stations. | Transfers from other stations. | |
| | | | | | | |
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| | | | | | | |
| 39,000 | | | 29,225 | | | 68,225 |
| 14,000 | | | 1,100 | | | 15,100 |
| | | | 11,250 | | | 11,250 |
| | | | 125 | | Erwin, 575 | 125 |
| | | | 230,600 | | | 360,600 |
| | | | | | | |
| | | | 173,450 | | | 173,450 |
| | | | 120 | | | 120 |
| 1,000,000 | | | | | | 1,000,000 |
| 48,160,000 | | | 21,719,600 | | | 69,879,600 |
| | | | | | | 3,233,012,237 |

## ALLOTMENTS TO STATE FISH COMMISSIONS.

As usual, various state fish commissions were supplied from the Bureau's stock with eggs to be hatched and distributed under their respective auspices. Following is a record of such allotments in 1910:

ALLOTMENTS OF FISH AND EGGS TO STATE FISH COMMISSIONS, FISCAL YEAR 1910.

| State and species. | Eggs. | Fingerlings, yearlings, and adults. | State and species. | Eggs. | Fingerlings, yearlings, and adults. |
|---|---|---|---|---|---|
| California: | | | New York: | | |
| Chinook salmon | 28,764,467 | | Blackspotted trout | 50,000 | |
| Colorado: | | | Rainbow trout | 41,500 | |
| Blackspotted trout | 225,000 | | Landlocked salmon | 15,000 | |
| Connecticut: | | | White perch | 15,000,000 | |
| Yellow perch | 5,200,000 | | North Dakota: | | |
| Illinois: | | | Steelhead trout | 100,000 | |
| Lake trout | 500,000 | | Pike perch | 10,000,000 | |
| Whitefish | 4,000,000 | | Ohio: | | |
| Pike perch | 8,000,000 | | Whitefish | 18,000,000 | |
| Rainbow trout | 41,264 | | Pike perch | 170,725,000 | |
| Michigan: | | | Oregon: | | |
| Landlocked salmon | 20,000 | | Chinook salmon | 6,465,300 | 60 |
| Lake trout | 5,000,000 | 3,500 | Blackspotted trout | 175,000 | 45 |
| Pike perch | 34,280,000 | | Pennsylvania: | | |
| Missouri: | | | Silver salmon | 75,000 | |
| Brook trout | 100,000 | | Blackspotted trout | 50,000 | |
| Rainbow trout | 25,000 | | Whitefish | 31,428,000 | |
| Pike perch | 2,000,000 | | Pike perch | 96,450,000 | |
| Minnesota: | | | Washington: | | |
| Large-mouth black bass | | 18,250 | Steelhead trout | 50,000 | |
| Montana: | | | Brook trout | 100,000 | |
| Blackspotted trout | 550,000 | | Wisconsin: | | |
| Whitefish | 500,000 | | Lake trout | 4,500,000 | 3,880 |
| Nevada: | | | Wyoming: | | |
| Blackspotted trout | 422,100 | | Blackspotted trout | 675,000 | |
| New Hampshire: | | | | | |
| Chinook salmon | 100,000 | | Total | 443,627,631 | 25,735 |

## SHIPMENTS TO FOREIGN COUNTRIES.

In response to requests reaching the Bureau through diplomatic channels, fish and fish eggs have been donated to foreign countries as follows:

SHIPMENTS OF FISH AND EGGS TO FOREIGN COUNTRIES, FISCAL YEAR 1910.

| Country. | Species. | Eggs. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Argentina | Chinook salmon | 200,000 | |
| | Silver salmon | 100,000 | |
| | Blueback salmon | 100,000 | |
| | Landlocked salmon | 25,000 | |
| | Lake trout | 50,000 | |
| France | Blackspotted trout | 10,000 | |
| Japan | Rainbow trout | 110,000 | |
| | Brook trout | 5,000 | |
| Mexico | Carp | | 25 |
| Total | | 600,000 | 25 |

## SUMMARIZED STATEMENT OF DISTRIBUTIONS.

The following table shows the numbers of eggs and fish actually distributed during the fiscal year 1910; or, in other words, the output of the hatcheries with all losses in transportation deducted. It thus does not agree with the tabulated summary in the Annual Report of the Commissioner for this year, compiled at an earlier date, which shows the numbers of eggs and fish delivered by the stations for distribution, the subsequent losses in transportation not being considered:

SUMMARY OF DISTRIBUTION OF FISH AND EGGS, FISCAL YEAR 1910.

| Species. | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Total. |
|---|---|---|---|---|
| Catfish | | | 531,892 | 531,892 |
| Carp | | | 22,710 | 22,710 |
| Buffalofish | | | 201,475 | 201,475 |
| Shad | 2,160,000 | 89,076,000 | | 91,236,000 |
| Whitefish | 55,428,000 | 195,719,000 | | 251,147,000 |
| Lake herring | 1,440,000 | 70,300,000 | | 71,740,000 |
| Silver salmon | 375,000 | 10,888,025 | | 11,263,025 |
| Chinook salmon | 37,531,417 | 16,342,556 | 66,045 | 53,940,018 |
| Blueback salmon | 100,000 | 121,136,995 | 21,719,600 | 142,956,595 |
| Humpback salmon | | 1,731,740 | | 1,731,740 |
| Steelhead trout | 250,000 | 3,570,287 | 179,718 | 4,000,005 |
| Rainbow trout | 556,494 | 595,616 | 1,705,328 | 2,857,438 |
| Atlantic salmon | 5,000 | 1,217,366 | 238,212 | 1,460,578 |
| Landlocked salmon | 115,000 | 974,040 | 301,064 | 1,390,104 |
| Blackspotted trout | 2,748,550 | 1,756,094 | 906,654 | 5,411,298 |
| Loch Leven trout | | | 68,248 | 68,248 |
| Lake trout | 10,210,000 | 33,645,922 | 4,286,150 | 48,142,072 |
| Brook trout | 516,000 | 7,365,945 | 4,085,174 | 11,967,119 |
| Sunapee trout | | 171,029 | | 171,029 |
| Grayling | 25,000 | 81,000 | 18 | 106,018 |
| Smelt | 4,500,000 | | 9,000 | 4,509,000 |
| Pike | | | 43,300 | 43,300 |
| Pickerel | | | 500 | 500 |
| Crappie and strawberry bass | | | 410,428 | 410,428 |
| Rock bass | | | 66,035 | 66,035 |
| Warmouth bass | | | 792 | 792 |
| Small-mouth black bass | | 537,400 | 109,986 | 647,386 |
| Large-mouth black bass | | 56,600 | 665,868 | 722,468 |
| Sunfish (bream) | | | 342,825 | 342,825 |
| Pike perch | 321,455,000 | 154,480,000 | 5,260 | 475,940,260 |
| Yellow perch | 5,200,000 | 326,885,000 | 108,439 | 332,193,439 |
| Striped bass | 4,566,000 | 2,784,000 | | 7,350,000 |
| White bass | | | 6,050 | 6,050 |
| White perch | 16,500,000 | 338,480,000 | | 354,980,000 |
| Yellow bass | | | 250 | 250 |
| Sea bass | | 808,000 | | 808,000 |
| Mackerel | | 764,000 | | 764,000 |
| Freshwater drum | | | 11,950 | 11,950 |
| Cod | 9,854,000 | 210,354,000 | | 220,208,000 |
| Pollock | | 38,140,000 | | 38,140,000 |
| Haddock | | 712,000 | | 712,000 |
| Flatfish | | 930,755,000 | | 930,755,000 |
| Lobster | | 162,505,000 | 1,532 | 162,506,532 |
| Total | 473,535,461 | 2,721,832,615 | 36,094,503 | 3,231,462,579 |

## DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS, FISCAL YEAR 1910.

### CATFISH.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Arizona: | |
| Grand Canyon, Berry's pond | 100 |
| Summit Pond | 100 |
| Holbrook, Becker's reservoir | 100 |
| Pratt's pond | 100 |
| Prescott, American Ranch Lake | 100 |
| Wilcox, Adling's pond | 100 |
| Ditmar's pond | 100 |
| Arkansas: | |
| Boonville, Branch Pond | 100 |
| Green Forest, Willow Pond | 100 |
| Harrison, Estes's pond | 125 |
| Helena, Mississippi River | 20,640 |
| Hiawassee, Rucker's pond | 100 |
| McNeil, Stevens's pond | 275 |
| Mammoth Spring, Warm Fork Creek | 100 |
| Stamps, Price Pond | 150 |
| Colorado: | |
| Pueblo, Skinner's reservoir | 100 |
| Rifle, White River | 200 |
| Georgia: | |
| Chamblee, Jones's pond | 100 |
| Idaho: | |
| Grangeville, Tolo Lake | 300 |
| Naples, Stampede Lake | 300 |
| Illinois: | |
| Avena, Sycamore Lake | 400 |
| Chicago, Armour's pond | 450 |
| Otis's pond | 450 |
| Galva, Mirror Pond | 500 |
| Odell, Odell Pond | 500 |
| Tremont, Pflederer's pond | 500 |
| Indiana: | |
| Boonville, Hemenway's pond | 500 |
| Buckskin, Buck's pond | 100 |
| Centerville, Townsend's pond | 100 |
| Evansville, Bockstege's pond | 100 |
| Heltonville, Ramsey's pond | 100 |
| Lewis, Freeze's pond | 100 |
| Pleasant Lake, Pleasant Lake | 200 |
| Tilden, Hadley's pond | 300 |
| Iowa: | |
| Chester, Upper Iowa River | 400 |
| Independence, Wapsipinicon River | 400 |
| Lime Springs, Upper Iowa River | 2,500 |
| Manchester, Maquoketa River | 4,000 |
| North McGregor, Mississippi River | 187,500 |
| Kansas: | |
| Goddard, Clear Creek Pond | 65 |
| Kansas City, Hosps's pond | 80 |
| Marquette, Sunny Pond | 65 |
| Pawnee, Payton's pond | 65 |
| Kentucky: | |
| Elizabethtown, Hagan's pond | 200 |
| Hodgensville, Nolin Creek | 400 |
| Nolin Creek, North Fork | 300 |
| Tharpe's pond | 200 |
| Louisiana: | |
| Grand Cane, Clear Springs Pond | 100 |
| Maryland: | |
| Loch Raven, Harrison's pond | 150 |
| Mountain Lock, Potomac River | 450 |
| Rocky Ridge, Owings Creek | 150 |
| Sharon, Rogers Pond | 150 |
| Massachusetts: | |
| Westdale, Taunton River | 500 |
| Michigan: | |
| Collins, Grand River | 480 |
| Jackson, Big Portage Lake | 480 |
| Grass Lake | 480 |
| Lakeview, Brimmer Lake | 1,000 |
| Tamarack Lake | 1,000 |
| Town Line Lake | 1,000 |
| Penn, Mud Lake | 650 |
| Portland, Grand River Pond | 480 |
| Minnesota: | |
| Brownsville, Mississippi River | 43,250 |
| Mahnomen, Mayzhuckegishig Lake | 800 |
| Rochester, Zumbro River, South Fork | 500 |
| Mississippi: | |
| Guntown, Cochran's pond | 100 |
| Missouri: | |
| Brandsville, Niessen's pond | 150 |
| Richland, Gasconade River | 400 |
| Seligman, Mountain Pond | 200 |
| Springfield, Appleby's pond | 200 |
| New Jersey: | |
| Mullica Hill, Mullica Hill Pond | 400 |
| Pompton Lakes, Pompton Lakes | 400 |
| Washington, Fair Haven Pond | 100 |
| New Mexico: | |
| Clovis, Laughing Water Pond | 100 |
| Columbus, Kennedy's pond | 80 |
| Corona, Ingram's pond | 80 |
| Deming, Burney's pond | 100 |
| Harris's pond | 200 |
| Hon's pond | 100 |
| Jacobson's pond | 100 |
| Kelly's pond | 100 |
| Elida, Brown's pond | 100 |
| La Lande, McGill's reservoir | 100 |
| Las Vegas, Asylum Lake | 100 |
| Pecos River | 100 |
| Montoya, Paloma Springs | 80 |
| Portales, Humble's pond | 100 |
| Twin Mill Ponds | 100 |
| Silver City, Central Creek Pond | 100 |
| Texico, Stafford's pond | 100 |
| Tucumcari, Buchanan's pond | 80 |
| New York: | |
| Cooperstown, Schuylers Lake | 300 |
| Greenport, Sills Pond | 150 |
| Unadilla, Susquehanna River | 300 |
| Walden, Wallkill River | 152 |
| Wallkill, Dwaarskill Creek | 155 |
| North Dakota: | |
| Devils Lake, Devils Lake | 3,000 |
| Glen Ullin, Burns's pond | 100 |
| Gwinner, Edmon's pond | 150 |
| Milnor, Stone Lake | 100 |
| Oakes, Christenson's pond | 150 |
| St. John, Bouvin Lake | 400 |
| Ohio: | |
| Bethel, McCarty's pond | 100 |
| Bradford, Greenville Creek | 250 |
| Upper Stillwater Creek | 150 |
| Cincinnati, Lake Como | 150 |
| Cridersville, Retreat Lake | 100 |
| Dola, Hively's pond | 100 |
| Ironton, Rucker's pond | 150 |
| Jackson, Long's pond | 100 |
| Marion, Scioto River | 250 |
| Orbiston, Orbiston Lakes | 100 |
| Ravenna, Infirmary Pond | 150 |
| Ripley, Hauke's pond | 150 |
| Rock Creek, Parks's pond | 100 |
| Stryker, Juillard's pond | 100 |
| Wapakoneta, Brown Pond | 400 |
| Youngstown, Mahoning River | 100 |
| Wickliffe Lake | 200 |
| Oklahoma: | |
| Aline, Elliott's pond | 100 |
| Bison, Springdale Pond | 100 |
| Chilocco, Chilocco Lagoon | 200 |
| Collinsville, Ellingswood Lake | 200 |
| Cushing, Prairie Lake | 100 |
| Twin Elm Lake | 125 |
| Wild Horse Pond | 150 |
| Enid, Spring Valley Creek | 100 |
| Erick, Garrett's pond | 100 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### CATFISH—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Oklahoma—Continued. | |
| Glencoe, Greenwood Lake | 75 |
| South Side Pond | 75 |
| Guymon, Jordan's pond | 250 |
| Hastings, Wabash Pond | 125 |
| Isabella, Wahl's pond | 100 |
| Lawton, Park Lake | 175 |
| Maramec, Maramec Lake | 150 |
| Marshall, Crouch's pond | 100 |
| Proctor's pond | 100 |
| Perkins, Canon Pond | 75 |
| Stigler, Hall's pond | 200 |
| Stillwater, Boomer Creek | 100 |
| Kautz's ponds | 75 |
| Nash's pond | 75 |
| Swartz's pond | 75 |
| Stratford, Davis's pond | 100 |
| Waynoka, Hancock's pond | 275 |
| Yost, Newman's pond | 75 |
| Yost Lake | 75 |
| Pennsylvania: | |
| Birdsboro, Monocacy Creek | 200 |
| Carbon Center, Carbon Center Pond | 100 |
| Factoryville, Lake Carey | 350 |
| Greensburg, Hacke Pond | 100 |
| Kingston, Ryman's pond | 400 |
| Rahns, Perkiomen Creek | 400 |
| Reading, Maiden Creek | 400 |
| Rupert, Wide Water Canal | 200 |
| Scottdale, Mill Race Pond | 150 |
| Smiths Ferry, Woodlawn Pond | 100 |
| Susquehanna, Churchill's lake | 300 |
| Susquehanna River | 300 |
| Troy, Cross Roads Creek | 100 |
| Lillmary Creek | 100 |
| Mud Creek | 100 |
| Sugar Creek | 450 |
| Wilkes Barre, Bear Lake | 150 |
| Wolmesdorf, Tulpehocken Creek | 400 |
| Wagners Pond | 400 |
| South Carolina: | |
| Blackville, Rodgers Pond | 175 |
| Graycourt, North Rabun Creek | 125 |
| Honea Path, Barkers Creek | 150 |
| Broad Creek | 200 |
| Haynie Pond | 150 |
| Kays Pond | 200 |
| Pickens, Bivers Lake | 250 |
| Holders Lake | 250 |
| Spring Lake | 300 |
| Thornley Pond | 200 |
| South Carolina—Continued. | |
| Starr, Pruitt's pond | 125 |
| Walhalla, Carey's pond | 125 |
| South Dakota: | |
| Fairfax, Manhalter's pond | 150 |
| Philip, Grindstone Pond | 200 |
| Presho, Corkill's lake | 200 |
| Scenic, Knutson's pond | 200 |
| Warner, Papke's pond | 200 |
| Vermont: | |
| Bellows Falls, Connecticut River | 400 |
| Virginia: | |
| Covington, McAllister's pond | 150 |
| Dillwyn, North River | 300 |
| Slate River | 300 |
| Gainesville, Broad Run | 300 |
| Houston, Easley Mill Pond | 230 |
| Occoquan, Occoquan River | 300 |
| Palmyra, Rivanna River | 350 |
| Urbanna, Jackson's pond | 550 |
| Washington: | |
| Addy, Blue Lake | 75 |
| Spring Lake | 75 |
| Anacortes, Lake Erie | 150 |
| Montesano, Silvia Lake | 150 |
| Oroville, Lemonosky Lake | 150 |
| West Virginia: | |
| Bedington, Emerson's pond | 150 |
| Benwood, Riedel's pond | 250 |
| Grafton, Otter Creek Pond | 250 |
| Nuttall, Chalybeate Spring Pond | 250 |
| Romney, Potomac River, South Branch | 550 |
| Wisconsin: | |
| Brillion, Long Lake | 300 |
| Round Lake | 300 |
| Genoa, Mississippi River | 4,166 |
| La Crosse, Mississippi River | 47,418 |
| Mauston, Drainage Canal | 300 |
| Pelican, Little Mud Lake | 300 |
| Rice Lake | 400 |
| Prairie du Chien, Mississippi River | 172,500 |
| Sheboygan Falls, Sheboygan River | 500 |
| Victory, Mississippi River | 1,666 |
| Wyoming: | |
| Lusk, "J. M." Company's pond | 400 |
| Moorcroft, Lone Tree Reservoir | 200 |
| Newcastle, Lodge Pole Creek | 250 |
| Sheridan, Big Horn Pond | 150 |
| Total[a] | 531,892 |

### CARP.

| | |
|---|---|
| Kansas: | |
| Pittsburg, North Lake | 35 |
| Minnesota: | |
| Brownsville, Mississippi River | 8,650 |
| New York: | |
| Riverhead, Harrison's pond | 100 |
| Oklahoma: | |
| Stillwater, Willow Pond | 100 |
| Vian, Allen's pond | 15 |
| Virginia: | |
| Wytheville, Brownings Mill Pond | 110 |
| Indian Creek | 10 |
| West Virginia: | |
| Moundsville, Jones's pond | 15 |
| Wisconsin: | |
| Genoa, Mississippi River | 1,666 |
| La Crosse, Mississippi River | 10,318 |
| Victory, Mississippi River | 1,666 |
| Mexico: | |
| Sonora, Ysabel Lake | 25 |
| Total | 22,710 |

[a] Lost in transit, 12,078 fingerlings.

## Details of Distribution of Fish and Fish Eggs—Continued.

### BUFFALOFISH.

| Disposition. | Fingerlings, yearlings, and adults. | Disposition. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Arkansas: | | Wisconsin: | |
| Helena, Mississippi River | 178,675 | Genoa, Mississippi River | 2,666 |
| Minnesota: | | La Crosse, Mississippi River | 11,318 |
| Brownsville, Mississippi River | 8,650 | Victory, Mississippi River | 166 |
| | | Total | 201,475 |

### SHAD.

| Disposition. | Eggs. | Fry. | Disposition. | Eggs. | Fry. |
|---|---|---|---|---|---|
| District of Columbia: | | | New Jersey—Continued. | | |
| Washington, Anacostia River | | 295,000 | Riverton, Delaware River | | 80,000 |
| Potomac River | | 682,000 | Timber Creek, Delaware River | | 120,000 |
| Maryland: | | | New York: | | |
| Accokeek Creek, Potomac River | | 980,000 | New York, New York Aquarium | 800,000 | |
| Broad Creek, Potomac River | | 2,504,000 | North Carolina: | | |
| Carpenters Point, North East River | | 234,000 | Edenton, Albemarle Sound | 1,360,000 | 47,762,000 |
| Havre de Grace, Chesapeake Bay | | 3,485,000 | Tarboro, Tar River | | 500,000 |
| Susquehanna River | | 821,000 | Oregon: | | |
| Swan Creek | | 396,000 | Willamette, Willamette River | | 1,588,000 |
| Occoquan Bay, Potomac River | | 898,000 | Pennsylvania: | | |
| Pamunkey Creek, Potomac River | | 5,044,000 | Poquessing Creek, Delaware River | | 200,000 |
| Piscataway Creek, Potomac River | | 4,621,000 | Virginia: | | |
| Swan Creek, Chesapeake Bay | | 70,000 | Dogue Creek, Potomac River | | 2,401,000 |
| Potomac River | | 3,572,000 | Little Hunting Creek, Potomac River | | 2,717,000 |
| Wild Duck Harbor, Susquehanna River | | 385,000 | Occoquan Creek, Potomac River | | 3,391,000 |
| New Jersey: | | | Pamunkey Creek, Potomac River | | 600,000 |
| Camden, Delaware River | | 803,000 | Pohick Creek, Potomac River | | 4,337,000 |
| Rancocas, Delaware River | | 500,000 | Washington: | | |
| | | | Hamilton, Skagit River | | 90,000 |
| | | | Total | 2,160,000 | 89,076,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### WHITEFISH.

| Disposition. | Eggs. | Fry. |
|---|---|---|
| Illinois: | | |
| Havana, Illinois Fish Commission | 4,000,000 | |
| Michigan: | | |
| Alpena, Lake Huron | | 1,000,000 |
| Belle Isle, Lake St. Clair | | 9,000,000 |
| Detour, Lake Huron | | 6,000,000 |
| Lake Michigan | | 3,000,000 |
| Detroit, Detroit River | | 16,000,000 |
| Escanaba, Lake Michigan | | 2,000,000 |
| Fish Island, Lake Superior | | 490,000 |
| Isle Royale, Lake Superior | | 13,100,000 |
| McCargoes Cove, Lake Superior | | 210,000 |
| Manistique, Lake Michigan | | 2,000,000 |
| Marquette, Lake Superior | | 4,655,000 |
| North Point, Lake Huron | | 9,000,000 |
| Skilligallee Reef, Lake Michigan | | 5,000,000 |
| St. Ignace, Lake Huron | | 2,000,000 |
| Sand Bay Reef, Lake Michigan | | 5,000,000 |
| Scarecrow Island, Lake Huron | | 5,000,000 |
| Simmons Reef, Lake Michigan | | 5,000,000 |
| Whitefish Point, Lake Superior | | 5,000,000 |
| Minnesota: | | |
| Duluth, Lake Superior | | 300,000 |
| Grand Marais, Lake Superior | | 3,000,000 |
| Susie Island, Lake Superior | | 3,000,000 |
| Montana: | | |
| Anaconda, Montana State Fishery | 500,000 | |
| New York: | | |
| Cape Vincent, Lake Ontario | | 1,500,000 |
| Chaumont, Lake Ontario | | 2,000,000 |
| Cooperstown, Otsego Lake | | 387,000 |
| Fox Island, Lake Ontario | | 3,500,000 |
| Fullers Bay, Lake Ontario | | 170,000 |
| Grenadier Island, Lake Ontario | | 5,500,000 |
| Hayes Point, Lake Ontario | | 2,000,000 |
| Mexico, Lake Ontario | | 4,000,000 |
| New York, New York Aquarium | 1,500,000 | |
| Oneida Lake, Oneida Lake | | 387,000 |
| Wilson Bay, Lake Ontario | | 1,500,000 |
| Ohio: | | |
| Catawba Island, Lake Erie | | 10,000,000 |
| Isle St. George, Lake Erie | | 10,000,000 |
| Kelleys Island, Lake Erie | | 20,000,000 |
| Lakeside, Lake Erie | | 20,000 |
| Put-in Bay, Lake Erie | | 25,000,000 |
| Ohio State Fish Commission | 18,000,000 | |
| Toledo, Lake Erie | | 10,000,000 |
| Pennsylvania: | | |
| Erie, Pennsylvania Fish Commission | 31,428,000 | |
| Total [a] | 55,428,000 | 195,719,000 |

### LAKE HERRING, OR CISCO.

| | | |
|---|---|---|
| Ohio: | | |
| Cleveland, Lake Erie | 1,440,000 | |
| Isle St. George, Lake Erie | | 10,000,000 |
| Kelleys Island, Lake Erie | | 10,000,000 |
| Lakeside, Lake Erie | | 300,000 |
| Middle Bass, Lake Erie | | 20,000,000 |
| Ohio—Continued. | | |
| Port Clinton, Lake Erie | | 10,000,000 |
| Put-in Bay, Lake Erie | | 10,000,000 |
| Toledo, Lake Erie | | 10,000,000 |
| Total | 1,440,000 | 70,300,000 |

### SILVER SALMON.

| | | |
|---|---|---|
| California: | | |
| Brookdale, San Lorenzo River | 100,000 | |
| Santa Cruz County Hatchery | 100,000 | |
| Pennsylvania: | | |
| Pleasant Mount, State Fish Commission | 75,000 | |
| Washington: | | |
| Baker, Baker Lake | | 5,308,848 |
| Lower Baker River | | 500,000 |
| Birdsview, Grandy Creek | | 5,079,177 |
| Argentina: | | |
| Buenos Aires, Argentine Government | 100,000 | |
| Total | 375,000 | 10,888,025 |

[a] Lost in transit, 245,000 fry.

## Details of Distribution of Fish and Fish Eggs—Continued.

### CHINOOK SALMON.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| California: | | | |
| Baird, McCloud River | | 2,286,257 | |
| Brookdale, Santa Cruz County Hatchery | 1,000,000 | | |
| Eel River, California Fish Commission | 1,549,500 | | |
| Point Reyes, applicant | 300,000 | | |
| Sisson, California Fish Commission | 27,214,967 | | |
| New Hampshire: | | | |
| Edgemont, Lake Sunapee | | | 7,380 |
| Laconia, New Hampshire Fish Commission | 100,000 | | |
| Newbury, Lake Sunapee | | | 51,200 |
| New York: | | | |
| New York, New York Aquarium | 5,000 | | |
| Port Kent, Lake Champlain | | | 3,600 |
| Tuxedo Park, applicant | 25,000 | | |
| Westport, Lake Champlain | | | 3,640 |
| Oregon: | | | |
| Bonneville, Oregon Fish Commission | 6,465,300 | | |
| Cazadero, Clackamas River | | 534,197 | |
| Clackamas, Clackamas River | | 3,686,200 | 70 |
| Oregon Fish Commission | | | 60 |
| Rogue River, Elk Creek | | 160,362 | |
| Rogue River | | 499,930 | |
| Wedderburn, applicant | 572,400 | | |
| Washington: | | | |
| Baker, Baker Lake | | 349,570 | |
| Big White Salmon, Columbia River | | 2,612,200 | |
| Spring Creek | | 900,000 | |
| Birdsview, Grandy Creek | | 705,840 | |
| Little White Salmon, Columbia River | | 1,900,000 | |
| Little White Salmon River | | 2,908,000 | |
| Seattle, Exposition Aquarium | 99,250 | | 95 |
| Argentina: | | | |
| Buenos Aires, Argentine Government | 200,000 | | |
| Total[a] | 37,531,417 | 16,342,556 | 66,045 |

### BLUEBACK SALMON.

| | | | |
|---|---|---|---|
| Alaska: | | | |
| Afognak, Ahuyon Creek | | 34,018,060 | |
| Letnik Lake | | 34,404,110 | |
| Yes Bay, McDonald Lake | | | 21,719,600 |
| Yes River | | 48,160,000 | |
| Washington: | | | |
| Baker, Baker Lake | | 4,404,825 | |
| Lower Baker River, Lower Baker River | | 150,000 | |
| Argentina: | | | |
| Buenos Aires, Argentine Government | 100,000 | | |
| Total | 100,000 | 121,136,995 | 21,719,600 |

[a] Lost in transit, 1,480 fingerlings.

### HUMPBACK SALMON.

| Disposition. | Fry. |
|---|---|
| Alaska: | |
| Afognak, Letnik Lake | 363,740 |
| Washington: | |
| Birdsview, Grandy Creek | 1,368,000 |
| Total | 1,731,740 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

STEELHEAD TROUT.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Maryland: | | | |
| Clear Spring, Tom Run Pond | | 12,000 | |
| Michigan: | | | |
| Humboldt, Black River | | | 10,000 |
| Michigamme River | | | 10,000 |
| Spruce River | | | 10,000 |
| Munising, applicant | 50,000 | | |
| Watersmeet, Duck Lake | | | 14,000 |
| Wetmore, Big Indian River | | | 32,000 |
| Minnesota: | | | |
| Duluth, Canosia Lake | | | 12,000 |
| Pike Lake | | | 21,000 |
| Knife River, Mic Mac Lake | | | 12,000 |
| Teteagonche Lake | | | 16,000 |
| Montana: | | | |
| Bozeman, Bridger Creek | | | 8,300 |
| Deer Lodge, Powell Lake | | | 1,500 |
| Libby, Kootenai River | | | 400 |
| Logging Creek, Belt Creek | | | 2,500 |
| Norris, Madison River Power Co. Lake | | | 6,000 |
| New York: | | | |
| Auburn, Owasco Lake | | 35,423 | |
| Pulaski, Salmon River | | 11,338 | |
| North Dakota: | | | |
| St. John, State fish commission | 100,000 | | |
| Oregon: | | | |
| Cazadero, Clackamas River | | 1,934,835 | |
| Eagle Creek, Eagle Creek | | 49,503 | |
| Rogue River, Elk Creek | | 89,850 | |
| Washington: | | | |
| Baker, Baker Lake | | 14,400 | |
| Birdsview, Day Creek | | 40,300 | |
| Grandy Creek | | 1,382,638 | |
| Seattle, Exposition Aquarium | | | 18 |
| State Fish Commission | 50,000 | | |
| Walla Walla, applicant | 25,000 | | |
| Wisconsin: | | | |
| Hudson, applicant | 25,000 | | |
| Lampson, Horse Shoe Lake | | | 14,000 |
| Spooner, Christie Lake | | | 10,000 |
| Total | 250,000 | 3,570,287 | 179,718 |

RAINBOW TROUT.

| | | | |
|---|---|---|---|
| Alabama: | | | |
| Tanner, Pecks Branch | | | 2,400 |
| Arizona: | | | |
| Flagstaff, Live Oak Creek | | | 7,200 |
| Rock Creek | | | 7,200 |
| Tucson, Sabino Creek | | | 6,000 |
| Winslow, Chevelon Creek | | | 7,200 |
| Arkansas: | | | |
| Bald Knob, Hart's pond | | | 4,000 |
| Berryville, Osage River | | 25,000 | |
| Crickette, Yocum Creek | | | 4,000 |
| Decatur, Lakeside Pond | | 7,500 | |
| Elkins, White River | | | 800 |
| Flippin, Goff's pond | | 7,500 | |
| Greenwood, Vache Grass Creek | | 7,000 | |
| Mammoth Spring, Spring River | | | 200 |
| Springdale, Lake Vaughan | | 7,000 | |
| Sulphur Springs, Williams's pond | | 7,000 | |
| California: | | | |
| Brookdale, Santa Cruz County hatchery | 13,680 | | |
| Colorado: | | | |
| Buena Vista, Chalk Creek | | | 6,000 |
| Cottonwood Creek | | | 6,000 |
| Middle Cottonwood Creek | | | 6,000 |
| South Cottonwood Creek | | | 6,000 |
| Buffalo, Platte River | | | 10,000 |
| Cimarron, Little Cimarron Creek | | 2,000 | |
| Colorado Springs, Frost's reservoir | | | 25 |
| Creede, applicant | 100,000 | | |
| Eldora, Lake Eldora | | | 8,535 |
| Estabrook, Mendenhall Creek | | | 3,750 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Colorado—Continued. | | | |
| Grand Mesa Lakes, Ward Lake | | 55,000 | |
| Grant, Geneva Lake | | | 2,500 |
| Platte River | | | 10,000 |
| Ivanhoe, Frying Pan River | | 10,500 | |
| Jefferson, Platte River | | 25,000 | |
| Kline, Platte River | | 25,000 | |
| Leadville, Musgcove's pond | | | 20,000 |
| Malta, Big Thompson Stream | 20,000 | | |
| Minturn, Eagle River | | | 9,000 |
| Moffat, Saguache Creek | | 25,000 | |
| Molina, Cottonwood Lakes | | 11,000 | |
| Montrose, East Dry Creek | | 4,000 | |
| New Castle, Divide Creek | | | 9,000 |
| Elk Creek | | | 9,000 |
| Pine Grove, Elk Creek | | | 3,750 |
| Wright's lake | | | 2,500 |
| Pueblo, Gunnison River | | 10,000 | |
| West Elk Creek | | 10,000 | |
| Salida, Little River | | 7,500 | |
| South Arkansas River | | 10,000 | |
| Shawnee, Price Creek | | | 2,500 |
| South Platte, South Platte River | | | 10,000 |
| South Platte River, South Fork | | | 12,500 |
| Telluride, Dolores River | | | 10,000 |
| Thomasville, applicant | | 25,000 | |
| Twin Lakes, Willow Lake | | 4,000 | |
| Webster, Beaver Creek | | | 2,500 |
| West Cliffe, Brush Creek Lake | | | 6,000 |
| Swift Creek | | | 6,000 |
| Georgia: | | | |
| Clayton, Hiawassee River | | | 4,000 |
| Mathias, Tallulah River | | | 4,000 |
| Oakman, Dry Creek | | | 4,000 |
| Rabun Gap, Charley Creek | | | 3,200 |
| Flat Branch | | | 2,400 |
| Mill Creek | | | 3,200 |
| Shook Creek | | | 2,400 |
| Tallulah River | | | 4,000 |
| Tate Creek | | | 2,400 |
| Ringgold, Murphy's pond | | | 1,600 |
| Idaho: | | | |
| Ashton, Eggbert Lake | | | 1,000 |
| Bliss, Far View Lakes | | | 1,500 |
| Cambridge, Little Weiser River | | | 1,000 |
| Hailey, applicant | 5,000 | | |
| Priest River, Skookum Pond | | | 500 |
| Troy, Pineview Pond | | | 600 |
| Illinois: | | | |
| Havana, Illinois Fish Commission | 11,200 | | |
| Indiana: | | | |
| St. Paul, Mill Creek | | | 2,000 |
| South Bend, Beyer's lake | | | 1,000 |
| Leeper Pond | | | 1,000 |
| Iowa: | | | |
| Manchester, Maquoketa River | | | 400 |
| North McGregor, Bloody Run | | | 3,000 |
| Postville, Livinggood Creek | | | 600 |
| Waukon, Silver Creek | | | 1,000 |
| Village Creek | | | 1,500 |
| Kansas: | | | |
| Erie, Canville Creek | | | 200 |
| Marion, Spring Creek | | | 2,000 |
| Maryland: | | | |
| Cumberland, Evitts Creek | | | 3,000 |
| Lakewood Lake | | | 2,000 |
| Minley Branch | | | 2,500 |
| Rocky Gap Creek | | | 2,000 |
| Mountain Lake Park, Broad Ford Creek | | | 5,000 |
| Little Youghiogheny River | | | 480 |
| Oakland, Browning Dam | | | 5,000 |
| Harvey's pond | | | 300 |
| Westminster, Fairview Pond | | | 500 |
| Michigan: | | | |
| Brentcreek, Gillett's pond | | | 1,000 |
| East Tawas, Cold Creek | | | 5,000 |
| Gaylord, Sturgeon River | | | 15,000 |
| Gladwin, Cedar River | | | 1,250 |
| Grayling, Tillula Lake | | | 590 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Michigan—Continued. | | | |
| Hillman, Thunder Bay River | | | 10,000 |
| Kalamazoo, applicant | 10,000 | | |
| Halls Springs Brook | | | 2,000 |
| Portage Creek | | | 2,000 |
| Paris, Muskegon River | | | 18,000 |
| Petersburg, Crystal Pond | | | 6,000 |
| Plymouth, Millers Creek | | | 500 |
| Rose Center, Buckhorn Creek | | | 12,000 |
| West Branch, Chapman Creek | | | 400 |
| Tittabawassa River | | | 1,250 |
| Wingleton, Marquette River | | | 18,750 |
| Marquette River, South Branch | | | 3,500 |
| Minnesota: | | | |
| Duluth, Archer Creek | | | 1,800 |
| Silica, Little Swan Creek | | | 3,000 |
| Winona, Stockton Creek | | | 2,500 |
| Missouri: | | | |
| Aurora, Spring Creek | | | 400 |
| Turnback Creek | | | 4,000 |
| Wistman Creek | | | 400 |
| Bourbon, Blue Spring Branch | | | 6,190 |
| Brown Springs, Brown Springs Lake | | | 400 |
| Cabool, Flag Lake | | 12,500 | |
| Clever, King's pond | | 7,500 | |
| Lucas Branch | | | 4,000 |
| Silver Lake Branch | | 20,000 | |
| Exeter, Roaring River | | 20,000 | |
| Galena, Langley's pond | | | 4,000 |
| Marshfield, James River | | | 6,000 |
| Neosho, Hickory River | | | 55 |
| Newburg, Little Piney River | | | 6,810 |
| Mill Creek | | | 4,000 |
| Reeds Spring, Moose Springs | | 2,500 | |
| St. James, Meramec Springs | | | 6,000 |
| St. Joseph, Missouri Fish Commission | 25,000 | | |
| Springfield, Spring Creek | | 15,000 | |
| Verona, Spring River | | 30,000 | |
| Wheaton, Joys Creek | | | 400 |
| Pogues Creek | | | 400 |
| Shoal Creek | | | 800 |
| Montana: | | | |
| Armstead, McIntosh Creek | | | 1,200 |
| Spring Creek | | | 1,200 |
| Bozeman, Wild Horse Run | | | 2,000 |
| Chinook, Box Elder Creek | | | 2,000 |
| Columbia Falls, Fish Lake | | | 2,000 |
| Delphia, Half Moon Lake | | | 1,000 |
| Dillon, Ajax Creek | | | 960 |
| Blacktail Deer Creek | | | 900 |
| Carter Creek | | | 2,400 |
| Lake Creek | | | 960 |
| North Fork River | | | 960 |
| Stewart Gulch | | | 960 |
| Strowbridge's pond | | | 960 |
| Tent Lake | | | 1,200 |
| Van Camp Creek | | | 1,200 |
| Emigrant, Dailey's lake | | | 2,000 |
| Fortine, Fortine Creek | | | 2,000 |
| Lakeview, Cliff Lake | | 4,000 | 4,000 |
| Elk Creek | | 10,000 | |
| Elk Lake | | 5,000 | |
| Hidden Lake | | 4,000 | |
| Thompson, Clear Creek | | | 1,500 |
| Squaw Creek | | | 1,500 |
| Townsend, Duck Creek | | | 2,000 |
| Nebraska: | | | |
| Andrews, White River | | | 10,000 |
| Gretna, Chadron Creek | | | 1,600 |
| Nevada: | | | |
| Verdi, Boulder Riffles | | | 4,000 |
| Chalk Bluff Pools | | | 4,000 |
| Marble Works Pools | | | 4,000 |
| Truckee River | | | 8,000 |
| New Jersey: | | | |
| Jersey City, Witterman's pond | | | 2,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| New Mexico: | | | |
| Cimarron, Aqua Fria Creek | | | 2,000 |
| Canon Bonita Creek | | | 1,000 |
| Cimarroncita Creek | | | 1,000 |
| Cimarron River | | | 1,000 |
| Clear Creek | | | 1,000 |
| Ponil Creek | | | 1,000 |
| Rayado Creek | | | 1,000 |
| Las Vegas, Gallinas River, West Fork | | 2,400 | |
| Raton, Myrtle Pond | | 1,200 | |
| Sugarite Creek | | 6,000 | |
| Roswell, Crystal Pond | | | 2,000 |
| New York: | | | |
| Adams, Big Sandy Creek | | 19,000 | |
| Buffalo, New York State Cancer Laboratory | | 500 | |
| Clifton, Wittenman Pond | | | 2,000 |
| Linlithgo, Forest, Fish, and Game Commission | 41,500 | | |
| New York, New York Aquarium | 5,000 | | |
| Valhalla, Wygoda Pond | | | 400 |
| Willsboro, Warm Pond | | 19,000 | |
| North Carolina: | | | |
| Addie, Buff Creek | | | 1,600 |
| Asheville, French Broad River | | | 100 |
| Midget Lake | | | 1,600 |
| Balsam, Scotts Creek | | | 3,200 |
| Barnard, Big Pine Creek | | | 4,000 |
| Black Mountain, Swanannoa River | | | 75 |
| Boonford, Big Crabtree Creek | | | 2,100 |
| South Toe River | | | 125 |
| Toe River | | | 150 |
| Brevard, Allison's lake | | | 4,000 |
| Bryson, Alarka Creek | | | 3,200 |
| Andress Creek | | | 2,400 |
| Bald Creek | | | 2,400 |
| Bear Creek | | | 2,400 |
| Bear Meat Creek | | | 2,400 |
| Big Hurricane Creek | | | 2,400 |
| Bridge Creek | | | 2,400 |
| Cherry Creek | | | 2,400 |
| Clingman Creek | | | 2,400 |
| Cold Spring | | | 2,400 |
| Conley Creek | | | 2,400 |
| Cooper Creek | | | 2,400 |
| Cullasowah Creek | | | 2,400 |
| Deep Creek | | | 3,200 |
| Galbreath Creek | | | 2,400 |
| Grassy Branch | | | 2,400 |
| Indian Creek | | | 2,400 |
| Jenkins Creek | | | 2,400 |
| Jones Creek | | | 2,400 |
| Kirkland Creek | | | 8,000 |
| Lands Creek | | | 2,400 |
| Laurel Creek | | | 2,400 |
| Little Hurricane Creek | | | 2,400 |
| Long Creek | | | 7,200 |
| Middle Hurricane Creek | | | 2,400 |
| Mill Creek | | | 2,400 |
| Nettle Creek | | | 2,400 |
| Noland Creek | | | 3,200 |
| North Fork Creek | | | 1,600 |
| Peach Tree Creek | | | 2,400 |
| Pigeon Creek | | | 2,400 |
| Saw Mill Creek | | | 2,400 |
| Shepherd Creek | | | 2,400 |
| Silver Creek | | | 2,400 |
| Una Creek | | | 2,400 |
| Watkins Creek | | | 2,400 |
| West Fork Creek | | | 1,600 |
| Bushnell, Chambers Creek | | | 3,200 |
| Indian Camp Creek | | | 2,400 |
| Kirklin Creek | | | 2,400 |
| Little Laurel Creek | | | 2,400 |
| Stecoah Creek | | | 2,400 |
| Cherokee, Lufty Creek | | | 2,400 |
| Soco Creek | | | 4,800 |
| Cranberry, Blevin Creek | | | 75 |
| Cranberry Creek | | | 75 |
| Roaring Creek | | | 3,200 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| North Carolina—Continued. | | | |
| Dillsboro, Big Savannah Creek | | | 2,400 |
| Dick Creek | | | 2,400 |
| Savannah Creek, East Fork | | | 2,400 |
| Elk Park, Banners Elk Creek | | | 3,200 |
| Dutch Creek | | | 75 |
| Elk River | | | 4,800 |
| Flat Rock, Lake Anina | | | 2,400 |
| Forneys, Mill Creek | | | 3,200 |
| Franklin, Burningtown Creek | | | 4,800 |
| Ellijay Creek | | | 3,200 |
| Tesentee Creek | | | 4,800 |
| Goldsboro, Melton Pond | | | 3,200 |
| Hendersonville, Big Hungry Creek | | | 4,000 |
| Boylston Creek | | | 4,000 |
| Green River | | | 4,800 |
| Kanuga Lake | | | 1,600 |
| Laurel Creek | | | 2,400 |
| Kellerville, Buckeye Creek | | | 50 |
| Laurel Creek | | | 75 |
| Lake Toxaway, Lake Toxaway | | | 64,800 |
| Linville Falls, Caleb Creek | | | 1,400 |
| Cane Creek | | | 1,400 |
| Irish Creek | | | 1,400 |
| Katy Creek | | | 1,400 |
| Linville River | | | 4,200 |
| Magazine Creek | | | 1,400 |
| Marion, Allison Creek | | | 1,400 |
| Bill Creek | | | 1,400 |
| Bow Creek | | | 4,000 |
| Buffalo Creek | | | 1,400 |
| Burgin Creek | | | 1,400 |
| Camp Rock Creek | | | 1,400 |
| Cedar Creek | | | 1,400 |
| Cherry Creek | | | 2,400 |
| Chestnut Fork Creek | | | 1,400 |
| Cove Creek | | | 1,400 |
| Crooked Creek | | | 1,400 |
| Curtis Creek | | | 1,400 |
| Davidson Creek | | | 1,400 |
| Devils Fork Creek | | | 1,400 |
| Duncan Creek | | | 2,100 |
| Fall Branch | | | 2,400 |
| Ford Creek | | | 2,400 |
| Gladis Creek | | | 1,400 |
| Hall Creek | | | 700 |
| Harrar Creek | | | 3,200 |
| Harris Creek | | | 1,400 |
| Little Fork Creek | | | 2,400 |
| Little River | | | 1,400 |
| Mackey Creek | | | 1,400 |
| Maple Creek | | | 1,400 |
| Newberry Fork Creek | | | 1,400 |
| Paddy Fork Creek | | | 1,400 |
| Pigeon Roost Creek | | | 1,400 |
| Roaring Fork Creek | | | 1,400 |
| Sahadrec Creek | | | 1,400 |
| Singed Cat Creek | | | 1,400 |
| Six Mile Creek | | | 2,400 |
| Spring Creek | | | 2,400 |
| Stony Creek | | | 3,200 |
| Turkey Creek | | | 1,400 |
| Turkey Otter Creek | | | 1,400 |
| Vess Creek | | | 2,400 |
| Morrisville, Sorrell's pond | | | 800 |
| Sycamore Pond | | | 3,200 |
| Old Fort, Crooked Creek Pond | | | 700 |
| Otto, Tesenta Pond | | | 3,200 |
| Pineola, Linville River | | | 450 |
| Poplar, Poplar Creek | | | 1,475 |
| Relief, Lewis's pond | | | 200 |
| Sevier, Armstrong Creek | | | 1,400 |
| Back Creek | | | 1,400 |
| Ball Creek | | | 2,800 |
| Beaver Creek | | | 1,400 |
| Crib Creek | | | 1,400 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| North Carolina—Continued. | | | |
| Sevier, Dobson Creek | | | 700 |
| Dysart Creek | | | 1,400 |
| Indian Creek | | | 1,400 |
| Lime Kiln Creek | | | 1,400 |
| Nix Creek | | | 1,400 |
| North Fork Creek | | | 1,400 |
| Oil Mill Creek | | | 1,400 |
| Owens Creek | | | 1,400 |
| Rollins Creek | | | 1,400 |
| Steel Creek | | | 1,400 |
| Table Creek | | | 1,400 |
| York Creek | | | 700 |
| Swain, Oconalufty River | | | 4,800 |
| Sylva, Abs Creek | | | 1,600 |
| Chastain Creek | | | 2,400 |
| Cullowhee Creek | | | 4,000 |
| Johns Creek | | | 2,400 |
| Moses Creek | | | 2,400 |
| Mull Creek | | | 3,200 |
| Ruft Bitt Creek | | | 3,200 |
| Sugar Creek | | | 2,400 |
| Toecane, Big Rock Creek | | | 75 |
| Greasey Creek | | | 75 |
| Linn Creek | | | 75 |
| Tomotla, Peachtree Creek | | | 3,200 |
| Tryon, Pocolet River | | | 4,000 |
| Vaughn Creek | | | 4,000 |
| Tuxedo, Green River | | | 12,000 |
| Pace Creek | | | 3,200 |
| Rock Creek | | | 5,600 |
| Vale, Cow Camp Creek | | | 75 |
| Willits, Scotts Creek | | | 3,200 |
| Winston-Salem, Nissen Park Pond | | | 1,600 |
| North Dakota: | | | |
| Braddock, Otter Creek | | | 1,450 |
| Edinburg, Park River, Middle Fork | | | 2,000 |
| Glen Ullin, Curlew Creek | | | 1,000 |
| Hebron, Knife River | | | 500 |
| Ohio: | | | |
| Akron, Adams's pond | | | 2,000 |
| Zanesville, Licking River | | | 5,000 |
| Oregon: | | | |
| Austin, Strawberry Lake | | 5,400 | |
| Baker City, Burnt River, North Fork | | 6,000 | |
| Deer Creek | | 3,000 | |
| Downey Lake | | 3,000 | |
| Eagle Creek | | 5,500 | |
| Fish Lake | | 3,000 | |
| Hilgard, Beaver Creek | | 3,000 | |
| Five Points Creek | | 6,000 | |
| Jordan Creek | | 3,000 | |
| Meadow Brook | | 2,000 | |
| Oregon City, Pine Creek | | 10,116 | |
| Pennsylvania: | | | |
| Bainbridge, Engle Run | | | 1,000 |
| Hoffman Run | | | 1,000 |
| Stackstown Run | | | 1,000 |
| Benton, West Creek | | | 5,000 |
| Berlin, Blue Lick Creek | | | 5,000 |
| Brush Creek | | | 4,000 |
| Chambersburg, Birch Creek | | | 6,000 |
| Carbaugh Run | | | 4,000 |
| Hoosic Run | | | 4,000 |
| Cherry Tree, Cush Creek | | | 4,000 |
| Cherry Run, Penn Run | | | 375 |
| Clarendon, Arnots Run | | | 3,000 |
| Farensworth Creek | | | 4,000 |
| Four Mile Run | | | 3,000 |
| Tionesta Creek | | | 3,000 |
| Tionesta Creek, West Branch | | | 5,000 |
| Cresco, Bushkill River | | | 2,400 |
| Goose Run | | | 1,500 |
| Levis Branch | | | 1,500 |
| Ebensburg, Chest Creek | | | 2,000 |
| Frackville, Kaufman Dam | | | 3,000 |
| Glen Iron, Penns Run | | | 1,125 |
| Green Hill, Big Woods Pond | | | 800 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Lanesboro, Tunkhannock Creek | | | 6,000 |
| Lehighton, Wild Creek | | | 3,000 |
| Lenover, Weaver Run | | | 2,000 |
| Middleport, Morgan Dam | | | 1,500 |
| Millersburg, Forney Run | | | 2,000 |
| Little Wicanisco Creek | | | 3,000 |
| Norristown, Elmwood Park Lake | | | 2,000 |
| Paddy Mountain, Penns Run | | | 2,250 |
| Pardee, Penns Run | | | 375 |
| Ridgeway, Big Mill Creek | | | 4,000 |
| Rising Springs, Penns Creek | | | 5,000 |
| Somerfield, Youghiogheny Creek | | | 7,000 |
| Tunkhannock, Bowmans Creek | | | 6,000 |
| Weikert, Penns Run | | | 375 |
| South Carolina: | | | |
| Cleveland, Middle Saluda River | | | 4,000 |
| Greenville, South Saluda River | | | 4,000 |
| Rosman, Cane Creek | | | 3,200 |
| Estatoe Creek | | | 4,000 |
| South Dakota: | | | |
| Buffalo Gap, Beaver Creek | | | 150 |
| Cascade Springs, Cascade Springs | | | 12,500 |
| Custer, French Creek | | | 5,775 |
| Spring Creek | | | 5,000 |
| Deadwood, Polo Creek | | | 8,000 |
| Elmore, Spearfish Creek | | | 5,325 |
| Hermosa, Squaw Creek | | | 150 |
| Hill City, Newton Fork Creek | | | 5,625 |
| Palmer Creek | | | 2,500 |
| Slate Creek | | | 2,500 |
| Spring Creek | | | 5,775 |
| Sunday Creek | | | 5,625 |
| Hot Springs, Palmer Lake | | | 12,500 |
| Iron Creek, Spearfish Creek | | | 4,500 |
| Nahant, Tilson Creek | | | 3,750 |
| Pine Ridge Agency, Wolf Creek | | | 12,500 |
| Rapid City, Dark Canyon Pond | | | 12,500 |
| Rapid Creek | | | 23,150 |
| Slate Creek | | | 150 |
| Spring Creek | | | 300 |
| St. Onge, False Bottom Creek | | | 600 |
| Scenic, Conklin Lake | | | 25,000 |
| Snowma, Stearn's pond | | | 500 |
| Spearfish, Driskill's pond | | | 500 |
| Spearfish Creek | | | 2,000 |
| Sturgis, Deadmans Creek | | | 10,000 |
| Spring Creek | | | 10,000 |
| Tennessee: | | | |
| Belleview, South Harpeth Creek | | | 4,000 |
| Blevins, Doe River | | | 100 |
| Bristol, Sinking Creek | | | 125 |
| Butler, Cable's pond | | | 1,200 |
| Lineback's pond | | | 75 |
| Spring Lake | | | 800 |
| Concord, Doughty's pond | | | 800 |
| Kirby's pond | | | 800 |
| Doyle Station, Sink Creek | | | 1,600 |
| Ducktown, Rough Creek | | | 3,200 |
| Dunn, Sugar Creek, West Fork | | | 1,600 |
| Elizabethtown, Hunter's Lake | | | 100 |
| Farner, Camp Creek | | | 2,450 |
| Fishery, North Indian Creek | | | 2,185 |
| Spring Branch | | | 220 |
| Fish Springs, Watauga River | | | 4,800 |
| Greenville, Camp Creek | | | 4,000 |
| Hampton, Laurel Creek | | | 175 |
| Hunter, Brush Creek | | | 4,000 |
| Johnson City, Brush Creek | | | 3,200 |
| Knoxville, Tennessee River | | | 50 |
| Marbleton, Garland's pond | | | 1,000 |
| Maryville, Mountain Pond | | | 800 |
| Oakdale, Emory Pond | | | 125 |
| Roan Mountain, Doe River | | | 4,800 |
| Hampton Creek | | | 3,200 |
| Heaton Creek | | | 3,200 |
| Rutledge, Manly's pond | | | 1,600 |
| Sevierville, Layman's pond | | | 800 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Tennessee—Continued. | | | |
| Sparta, Calf Killer Creek | | | 4,000 |
| Springfield, Red River | | | 4,000 |
| Telford, Bailey's pond | | | 50 |
| Tullahoma, Compton Creek | | | 3,200 |
| Walland, Hesser Creek | | | 4,000 |
| Little River | | | 4,125 |
| Wolf Creek, Wolf Creek | | | 4,000 |
| Utah: | | | |
| Charleston, applicant | 125,000 | | |
| Murray, applicant | 59,400 | | |
| Provo, Dry Creek Pond | | 6,000 | |
| Provo River | | 48,000 | |
| Virginia: | | | |
| Afton, Afton Pond | | | 300 |
| Ashland, South Anna River | | | 8,000 |
| Big Island, Hunting Creek | | | 2,500 |
| Cedar Bluff, Indian Creek | | | 12,000 |
| Cleveland, Bacon Creek | | | 3,000 |
| Big Cedar Creek | | | 18,000 |
| Burgess Creek | | | 9,000 |
| Gilmer Creek | | | 3,000 |
| Little Cedar Creek | | | 12,000 |
| Opossum Creek | | | 6,000 |
| Covington, Cedar Creek | | | 4,000 |
| Falling Springs Run | | | 200 |
| Culpeper, Hazel River | | | 4,800 |
| Miller Creek | | 7,000 | |
| Faber, Cover Creek | | | 6,400 |
| Fairwood, Big Holton Creek | | | 6,400 |
| Marion, Holston River, South Fork | | | 12,000 |
| Mount Jackson, Garlick Hollow Run | | | 800 |
| Natural Bridge, Cedar Creek Dam | | | 500 |
| New Castle, Meadow Creek | | | 2,000 |
| Roanoke, Falling Creek Reservoir | | | 3,200 |
| Vinton Spring Lake | | | 2,400 |
| Rural Retreat, Buchanan's pond | | | 2,400 |
| Salem, Back Creek | | | 8,000 |
| Seven Mile Ford, Comer Creek | | | 12,000 |
| Holston River, South Fork | | | 8,000 |
| Somerset, Rapidan River | | | 1,125 |
| Springwood, Cummings's pond | | | 300 |
| Stanley, Henderson's pond | | | 1,000 |
| Sugar Grove, Holston River, South Fork | | | 8,000 |
| Waynesboro, Lithia Pond | | | 300 |
| West Point, Remlick Hall Pond | | | 3,000 |
| Wytheville, Cove Creek | | | 6,400 |
| Washington: | | | |
| Colville, Black Lake | | | 2,000 |
| Colville River | | | 3,000 |
| Harrington, Crab Creek | | | 4,000 |
| Republic, Granite Creek | | | 4,000 |
| Seattle, Exposition Aquarium | | | 18 |
| Sumner, Salmon Creek Pond | | | 1,000 |
| Valley, Bond Lake | | | 3,000 |
| West Virginia: | | | |
| Blake, Loup Creek | | | 1,500 |
| Capon Springs, Trout Run | | | 3,650 |
| Yellow Stream Gap | | | 3,650 |
| Holly Junction, Elk River | | | 750 |
| Keyser, Patterson Creek | | | 4,300 |
| Marlinton, Elk River | | | 2,500 |
| Midvale, Middle Fork River | | | 7,500 |
| Rippon, Wiest's pond | | | 1,000 |
| Seebert, Cranberry Creek | | | 38,500 |
| Spring Creek, Sinking Creek | | | 3,000 |
| Stonewall, Piney Creek | | | 21,000 |
| Surveyor, Clay Pond | | | 500 |
| White Sulphur Springs, Howard Creek | | | 3,000 |
| Spring Branch | | | 2,000 |
| Wildell, Greenbrier River | | | 5,000 |
| Laurel Run | | | 5,000 |
| Wright, Piney Run | | | 24,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### RAINBOW TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin: | | | |
| Independence, Borst Valley Creek | | | 3,000 |
| Chimney Rock Creek | | | 3,000 |
| Cook Creek | | | 1,200 |
| Elk Creek | | | 3,000 |
| Fox Creek | | | 1,500 |
| Tamarack Creek | | | 2,500 |
| Traverse Valley Creek | | | 3,000 |
| Trempealeau River | | | 3,000 |
| Kendall, Lumsden Creek | | | 1,200 |
| Tunnell Creek | | | 1,500 |
| Sparta, Lower La Crosse River | | | 3,000 |
| Spring Valley, Eau Galle River | | | 4,000 |
| Wyoming: | | | |
| Beulah, Sand Creek | | | 5,000 |
| Cheyenne, Polaris Reservoir | | 12,000 | |
| Lander, Glacier Lake | | | 3,600 |
| Lodge Pole Lake | | | 2,000 |
| Shoshone Lake | | | 2,000 |
| Laramie, Laramie River | | 7,000 | |
| Moorcroft, Riordan Lake | | | 1,000 |
| Sheridan, Patrick's reservoir | | | 1,500 |
| Wamsutter, Bens Lake | | | 300 |
| Wheatland, Development Company's reservoir | | | 10,000 |
| Yellowstone National Park, Rock Lake | | | 10,000 |
| Gibbon River | | | 15,000 |
| Japan: | | | |
| Tokio, Imperial Household Department | 110,000 | | |
| Total[a] | 556,494 | 595,616 | 1,705,328 |

### ATLANTIC SALMON.

| | | | |
|---|---|---|---|
| District of Columbia: | | | |
| Washington, Central Station Aquarium | | | 100 |
| Maine: | | | |
| Brownville, Pleasant River | | | 76,500 |
| East Orland, Alamoosook Lake | | | 5,139 |
| Guilford, Piscataquis River | | | 41,000 |
| Milo, Pleasant River | | | 33,000 |
| Staceyville, Penobscot River | | 1,217,366 | 82,413 |
| New York: | | | |
| Buffalo, New York State Cancer Laboratory | | | 60 |
| New York, New York Aquarium | 5,000 | | |
| Total | 5,000 | 1,217,366 | 288,212 |

### LANDLOCKED SALMON.

| | | | |
|---|---|---|---|
| Idaho: | | | |
| Hope, Lake Pend d'Oreille | | | 4,000 |
| Maine: | | | |
| Auburn, Lake Auburn | | | 7,500 |
| Taylor's pond | | 33,000 | |
| Augusta, Cobbosseecontee Lake | | | 7,500 |
| Baker, Baker's pond | | | 2,000 |
| Bingham, Rowe's pond | | | 2,000 |
| Brewer Junction Brewer Pond | | | 2,751 |
| Brownfield, Moose Pond | | 24,750 | |
| Bryant Pond, Lake Christopher | | 16,500 | |
| Twickell Pond | | 16,500 | |
| Bucksport, Toddy Pond | | | 6,000 |
| Dedham, Branch Pond | | 30,000 | 5,000 |
| Green Lake | | | 15,000 |
| Dover, Sebec Lake | | | 10,500 |
| East Orland, Alamoosook Lake | | | 13 |
| Ellsworth, Patten's pond | | 25,000 | 2,000 |
| Ellsworth Falls, Alligator Lake | | | 6,000 |
| Beach Hill Pond | | 20,000 | |
| Flood's pond | | 24,750 | |

[a] Lost in transit, 18,100 fry.

## Details of Distribution of Fish and Fish Eggs—Continued.

### LANDLOCKED SALMON—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Maine—Continued. | | | |
| Enfield, Cold Stream Pond | | | 9,000 |
| Farmington, Big Island Pond | | | 4,500 |
| Franklin, Donnell's pond | | 24,750 | |
| George's pond | | 24,750 | |
| Molasses Pond | | 24,750 | |
| Green Lake, Arnold's pond | | | 4,500 |
| Grand Lake Stream, Dobsis Lake | | 65,000 | 4,500 |
| Grand Lake | | 316,440 | 17,700 |
| Holden, Fitz Pond | | 24,750 | |
| Kennebunk, Kennebunk Pond | | 24,750 | |
| Kinco Station, Moosehead Lake | | 32,000 | 10,500 |
| Lincoln, Mattamawcook Lake | | 5,000 | |
| Mosquito, Lake Moxie | | 18,000 | |
| Newport, Lake Sebasticook | | | 13,500 |
| North Anson, Great Emden Lake | | 24,750 | |
| Oquossoc, Rangeley Lakes | | | 9,000 |
| Otis, Green Lake | | 50,000 | 70,000 |
| Peru, Worthley's pond | | 21,600 | |
| Phillips Lake, Phillips Lake | | | 6,000 |
| Portage, Portage Lake | | 30,000 | 3,500 |
| Sawyers Island, Campbell's pond | | | 3,000 |
| Sebago Lake, Sebago Lake | | 15,000 | |
| Skowhegan, Lake George | | 21,750 | |
| South Paris, Concord Pond | | | 6,000 |
| Strong, Sweet's pond | | | 6,000 |
| Thorndike, St. Georges Lake | | | 7,500 |
| Tunk Pond, Tunk Pond | | 24,750 | 6,000 |
| Warren, Crawford's lake | | | 6,000 |
| Wescott, Little Ossipee Pond | | | 5,700 |
| Wilton, Wilson Lake | | 15,000 | |
| Michigan: | | | |
| Munising, applicant | 10,000 | | |
| Sault Ste. Marie, Michigan Fish Commission | 20,000 | | |
| Montana: | | | |
| Gardner, Yellowstone Park waters | | | 8,000 |
| New York: | | | |
| Old Forge, applicant | 15,000 | | |
| Forest, Fish, and Game Commission | 15,000 | | |
| Pleasant Lake, Pleasant Lake | | 14,500 | |
| Raquette Lake, Lake Kora | 30,000 | | |
| Vermont: | | | |
| Averill, Averill Pond | | | 1,000 |
| Little Averill Lake | | 2,000 | |
| Brandon, Lake Dunmore | | | 2,500 |
| Newport, Salem Pond | | 1,000 | |
| Washington: | | | |
| Ephrata, Moses Lake | | | 5,000 |
| Wisconsin: | | | |
| Luck, McKenzie Lake | | | 11,400 |
| Wyoming: | | | |
| Lander, Christiana Lake | | | 5,000 |
| Grave Lake | | | 5,000 |
| Argentina: | | | |
| Buenos Aires, Argentine Government | 25,000 | | |
| Total[a] | 115,000 | 974,040 | 301,064 |

### BLACKSPOTTED TROUT.

| | | | |
|---|---|---|---|
| Arizona: | | | |
| Grand Canyon, Hull Pond | | | 3,750 |
| Little Hull Pond | | | 3,750 |
| Colorado: | | | |
| Antonito, Conejos River | | 19,440 | |
| La Jara River | | 4,320 | |
| Cardinal, Develin Lakes and Creek | | 9,500 | |
| Cascade, Cascade Brook | | 10,000 | |
| Cebolla, Elk Creek | | 10,000 | |
| Gunnison River | | 25,706 | |
| Red Creek | | 4,000 | |
| Cimarron, Little Cimarron River | | 10,000 | |
| Cliff, Platte River | | 4,850 | |
| DeBeque, Bull Creek Lake | | 15,000 | |

[a] Lost in transit, 11,000 fry and 2,300 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Colorado—Continued. | | | |
| Denver, Colorado Fish Commission | 225,000 | | |
| Dillon, Rock Creek | | 3,600 | |
| Slate Creek | | 3,600 | |
| Straight Creek | | 3,600 | |
| Fort Collins, Cache la Poudre River | | 30,700 | |
| Pine Creek | | 31,010 | |
| Glenisle, Platte River | | 3,600 | |
| Glenwood Springs, Mitchell Creek | | 10,000 | |
| Grand Valley, Parachute Creek | | 10,000 | |
| Gunnison, Bird Lakes | | 4,000 | |
| Insmont, Rock Creek | | 2,400 | |
| Loveland, Big Thompson | | 40,746 | |
| Marshall, South Boulder Creek | | 14,400 | |
| Molina, Cottonwood Creek | | 10,000 | |
| Cottonwood Lakes | | 52,748 | |
| East Bull Creek | | 10,000 | |
| Monte Vista, Rock Creek, South Fork | | 6,000 | |
| Montrose, Big Red Canyon Creek | | 8,000 | |
| Spring Creek | | 6,000 | |
| West Dry Creek | | 6,000 | |
| Nast, Frying Pan River | | 10,500 | |
| New Castle, Divide Creek | | 12,500 | |
| Parlin, Quartz Creek | | 6,000 | |
| Pine Grove, Elk Creek | | 4,800 | |
| Ridgway, Cow Creek | | 12,000 | |
| Dallas Creek | | 12,000 | |
| Rifle, Williams River | | 22,000 | |
| Salida, Arkansas River | | 22,500 | |
| Little River | | 7,500 | |
| Poncha Creek | | 10,000 | |
| South Fork, Rio Grande River, South Fork | | 6,000 | |
| Wheeler, West Tenmile Creek | | 8,400 | |
| Idaho: | | | |
| Bonner County, Bonanza Lake | | | 10,000 |
| Darsey, Stevens Peak Lake | | | 7,500 |
| Greer, Wells Pond | | | 2,500 |
| McCammon, Mountainview Lake | | | 3,000 |
| Rupert, Lake Walcott | | | 12,000 |
| Soda Springs, Knollins Springs | | | 3,000 |
| Spirit Lake, Kit Carson Creek | | | 5,000 |
| Twin Falls, Blue Lake Creek | 50,000 | | |
| Wallace, Lost Lake | | | 7,500 |
| Michigan: | | | |
| Detroit, Detroit Aquarium | 10,000 | | |
| Montana: | | | |
| Anaconda, Montana Fish Commission | 550,000 | | |
| Baker, Baker Lake | | | 16,000 |
| Ballantine, Arrow Creek | | | 4,000 |
| Belton, Lake McDonald | | | 12,000 |
| Big Timber, Big Boulder River | | | 4,000 |
| Bozeman, West Gallatin River, South Fork | | | 5,000 |
| Butte, Columbia Gardens Hatchery | 440,000 | | |
| Chinook, Peoples Creek | | | 8,000 |
| Chinook, Snake Creek | | | 8,000 |
| Craig, Burke's reservoir | | | 6,000 |
| Darby, Tin Cup Lake | | | 10,000 |
| Dorsey, Checkerboard Creek | | | 6,000 |
| Little Birch Creek | | | 6,000 |
| Woods Gulch Creek | | | 6,000 |
| Harlowton, Musselshell River | | | 8,000 |
| Havre, Clear Creek | | | 6,000 |
| Helena, Chessman Reservoir | | | 8,000 |
| Josephine, Sixteen Mile Creek | | | 8,000 |
| Kalispell, Corneilson's spring | | | 6,000 |
| Corneilson's lake | | | 6,000 |
| Howser's lake | | | 6,000 |
| Lewistown, Beaver Creek | | | 6,000 |
| Big Casino Creek | | | 6,000 |
| Big Spring Creek | | | 14,000 |
| Casino Creek | | | 6,000 |
| Cottonwood Creek | | | 12,000 |
| Surprenant's pond | | | 12,000 |
| Livingston, Fitzpatrick's pond | | | 2,000 |
| Trowbridge Creek | | | 4,000 |
| Martinsdale, Musselshell River, North Fork | | | 8,000 |
| Missoula, Bitter Root River | | | 10,000 |
| Monarch, Tillinghast Creek | | | 6,000 |
| Neihart, Belt Creek | | | 6,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Montana—Continued. | | | |
| Red Lodge, Silver Run | | | 2,000 |
| Somers, Lake Alexander | | | 6,000 |
| Skagg Lake | | | 6,000 |
| Townsend, Due Creek | | | 6,000 |
| Twodot, Haymaker Pond | | | 6,000 |
| Winston, Stanbach Reservoir | | | 6,000 |
| Nebraska: | | | |
| Chadron, Big Bordeaux Creek | | | 12,000 |
| Nevada: | | | |
| Derby, Nevada Fish Commission | 298,300 | | |
| Truckee River | | 85,000 | |
| Verdi, Bates's pond | | | 3,000 |
| Galena Creek | | | 3,000 |
| Nevada Fish Commission | 123,800 | | |
| South Branch | | | 3,000 |
| Truckee River | 16,450 | 633,020 | 6,000 |
| Whites Creek | | | 3,000 |
| New Mexico: | | | |
| Cimarron, Cañon Bonito Creek | | | 2,000 |
| Cimarronciti Creek | | | 2,000 |
| Cimarron River | | | 2,000 |
| Clear Creek | | | 2,000 |
| Ponil Creek | | | 2,000 |
| Rayado Creek | | | 2,000 |
| Rayado River, West Fork | | | 3,000 |
| Ute Creek | | | 4,000 |
| Glorieta, Pecos River | | 14,400 | |
| Las Vegas, Burro Branch | | 4,800 | |
| Gallinas River | | 6,000 | |
| Mountain Park, Fresnal Creek | | | 15,000 |
| Sante Fe, Rio Tesuque River | | 7,200 | |
| New York: | | | |
| New York, New York Aquarium | 25,000 | | |
| Saranac Inn, Forest, Fish, and Game Commission | 50,000 | | |
| Oregon: | | | |
| Clackamas, Oregon fish commission | | | 45 |
| Medford, Four Bit Creek | | 12,000 | |
| Rancharee Creek | | 12,000 | |
| Rogue River | | 16,000 | |
| Milwaukee, Lechler Lake | | 8,000 | |
| Newberg, Walton's pond | | 14,214 | |
| Oregon City, Clackamas River | | 20,000 | |
| Portland, Oregon fish commission | 175,000 | | |
| Pennsylvania: | | | |
| Pleasant Mount, Pennsylvania fish commission | 50,000 | | |
| South Dakota: | | | |
| Aberdeen, Milwaukee Reservoir | | | 10,000 |
| Buffalo Gap, Beaver Creek | | | 7,000 |
| Custer, Flynn Creek | | | 16,000 |
| French Creek | | | 6,000 |
| Elmore, Spearfish Creek | | | 35,000 |
| Spearfish Creek, Southwest Branch | | | 9,000 |
| Englewood, White Wood Creek | | | 30,000 |
| Hermosa, Squaw Creek | | | 5,000 |
| Hill City, Castle Creek | | | 30,000 |
| Spring Creek | | | 21,000 |
| Hisega, Rapid Creek | | | 35,000 |
| Iron Creek, Spearfish River | | | 8,000 |
| Maitland, Fredbert Pond | | | 5,000 |
| Mystic, Rapid Creek | | | 30,000 |
| Rapid City, Electric Light Pond | | | 12,500 |
| North Side Park Pond | | | 2,500 |
| Price Pond | | | 6,000 |
| Rapid Creek | | | 47,750 |
| Slate Creek | | | 5,000 |
| Spring Creek | | | 6,000 |
| Saint Onge, False Bottom Creek | | | 40,000 |
| Spearfish, Spearfish Creek | | | 25,000 |
| Utah: | | | |
| Provo, applicant | 50,000 | | |
| Provo River | | 20,000 | |
| Virginia: | | | |
| Sweet Chalybeate, Sweet Springs Branch | | | 2,480 |
| Washington: | | | |
| Seattle, Exposition Aquarium | 50,000 | | 42 |
| Spokane, Selheim Springs Pond | | | 5,000 |
| Walla Walla, Shelton's lake | | | 737 |
| Spring Creek | | | 600 |
| Winona, Palouse River | | | 10,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BLACKSPOTTED TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wyoming: | | | |
| Beulah, Crystal Springs | | | 6,000 |
| Crook County, Sand Creek | | | 15,000 |
| Yellowstone National Park, Cub Creek | | 400,000 | |
| Lander, Grave Lake | | | 11,200 |
| Hobbs Lake | | | 4,200 |
| Raft Lake | | | 5,600 |
| Little Wind River, South Fork | | | 5,600 |
| Trail Lake | | | 8,400 |
| Laramie, Wyoming fish commission | 175,000 | | |
| Moorcroft, Prairie Creek | | | 21,250 |
| Sheridan, Wyoming fish commission | 500,000 | | |
| Shoshone, Big Wind Lake | | | 15,000 |
| Wamsutter, Stocks Lake | | | 18,750 |
| France: | | | |
| Bellefontaine, French Government | 10,000 | | |
| Total[a] | 2,748,550 | 1,756,094 | 906,654 |

LOCH LEVEN TROUT.

| | | | |
|---|---|---|---|
| South Dakota: | | | |
| Savoy, Little Spearfish Creek | | | 68,248 |

LAKE TROUT.

| | | | |
|---|---|---|---|
| Colorado: | | | |
| Twin Lakes, Upper Twin Lake | | 24,700 | |
| Idaho: | | | |
| Hope, Lake Pend d'Oreille | | | 18,000 |
| Rathdrum, Twin Lake | | | 4,000 |
| Illinois: | | | |
| Havana, Illinois Fish Commission | 500,000 | | |
| Maine: | | | |
| Bridgton, Highland Lake | | 11,000 | |
| Cherryfield, Mopang Lake | | 11,000 | |
| East Wilton, Pease Pond | | 11,000 | |
| Green Lake, Green Lake | | 263,922 | |
| North Anson, Great Emden Lake | | 11,000 | |
| Readfield, Parker's pond | | 11,000 | |
| Skowhegan, Lake George | | 10,000 | |
| Unity, Unity Pond | | 11,000 | |
| Massachusetts: | | | |
| Marlboro, Lake Williams | | 9,000 | |
| Michigan: | | | |
| Big Rock Reef, Lake Michigan | | 756,000 | |
| Cat Head Reef, Lake Michigan | | 756,000 | |
| Charlevoix Reef, Lake Michigan | | 2,268,000 | |
| Charlevoix, Pine Lake | | 756,000 | |
| Detour, Lake Huron | | 2,000,000 | |
| Detroit, Detroit Aquarium | 10,000 | | |
| Escanaba, Lake Michigan | | 150,000 | |
| Fishermans Island, Lake Michigan | | 1,512,000 | |
| Fish Island, Lake Superior | | 600,000 | |
| Grand Marais, Lake Superior | | 700,000 | |
| Isle Royale, Lake Superior | | 1,975,000 | 2,052,500 |
| Long Point, Lake Superior | | | 600,000 |
| McCargoes Cove, Lake Superior | | 275,000 | |
| McLeods Channel, Lake Superior | | 1,025,000 | |
| Mandan, Lake Medora | | | 16,000 |
| Manistique, Lake Michigan | | 150,000 | |
| Marquette, Lake Superior | | 1,400,000 | |
| Munising, Lake Superior | | 1,400,000 | |
| North Point, Lake Huron | | 2,050,000 | |
| North Point Reef, Lake Michigan | | 756,000 | |
| Norwood Reef, Lake Michigan | | 756,000 | |
| Ontonagon, Lake Superior | | 1,400,000 | |
| Paris, Michigan Fish Commission | 2,000,000 | | 3,500 |
| Petosky, Lake Michigan | | 756,000 | |
| Point Iroquois, Whitefish Bay | | 700,000 | |
| Sault Ste. Marie, Michigan Fish Commission | 3,000,000 | | |

[a] Lost in transit, 9,740 fry.

## Details of Distribution of Fish and Fish Eggs—Continued.

### LAKE TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Michigan—Continued. | | | |
| Scarecrow Island, Lake Huron | | 1,950,000 | |
| Seven Mile Point, Lake Michigan | | 756,000 | |
| Skilligallee Reef, Lake Michigan | | 1,512,000 | |
| Tobins Harbor, Lake Superior | | | 780,000 |
| Washington Harbor, Lake Superior | | | 660,000 |
| Whitefish Point, Lake Superior | | 2,000,000 | |
| Minnesota: | | | |
| Grand Rapids, Pokegama Lake | | | 20,000 |
| Little Falls, Lake Alexander | | | 20,000 |
| Montana: | | | |
| Helena, Lake Sewell | | | 6,900 |
| New York: | | | |
| Auburn, Owasco Lake | | 40,000 | |
| Charity Shoals, Lake Ontario | | 450,000 | |
| Cooperstown, Otsego Lake | | 40,000 | |
| Dutch Point, Lake Ontario | | 100,000 | |
| Fox Island, Lake Ontario | | 1,000,000 | |
| Fulton Chain, Little Moose and Panther Lakes | | 32,000 | |
| Grenadier Island, Lake Ontario | | 1,627,000 | |
| Hayes Point, Lake Ontario | | 750,000 | |
| McKeever, Bisby Chain of Lakes | | 24,000 | |
| Point Peninsula, Lake Ontario | | 450,000 | |
| Raquette Lake, Lake Kora | 150,000 | | |
| Riverside, Schroon Lake | | 40,000 | |
| Wilson Bay, Lake Ontario | | 100,000 | |
| North Dakota: | | | |
| St. John, Lake Lindeman | | | 20,000 |
| Oregon: | | | |
| Haines, Rock Creek Lake | | 11,300 | |
| Pennsylvania: | | | |
| Waterford, Lake Leboeff | | 17,500 | |
| Vermont: | | | |
| Averill, Big Averill Lake | | 30,000 | |
| Barnet, Harvey's pond | | 35,000 | |
| Barton, Silver Lake | | 17,500 | |
| Stone Pond | | 17,500 | |
| Brandon, Lake Dunmore | | | 3,370 |
| Hardwick, Elligo Pond | | 15,000 | |
| Orleans, Willoughby Lake | | 35,000 | |
| Readsboro, Howe's pond | | 14,000 | |
| West Burke, Newark Pond | | 17,500 | |
| Wisconsin: | | | |
| Brule, Twin Lakes | | | 10,000 |
| Crandon, Dry Lake | | | 12,000 |
| Metonga Lake | | | 12,000 |
| Stone Lake | | | 12,000 |
| Haugen, Monday Lake | | 16,000 | |
| New Auburn, Wisconsin Fish Commission | | | 3,880 |
| Oshkosh, Wisconsin Fish Commission | 4,500,000 | | |
| State Line, Black Oak Lake | | | 32,000 |
| Stone Lake, Little Stone Lake | | 10,000 | |
| Sand Lake | | 12,000 | |
| Stone Lake | | 12,000 | |
| Argentina: | | | |
| Buenos Aires, Argentine Government | 50,000 | | |
| Total [a] | 10,210,000 | 33,645,922 | 4,286,150 |

### BROOK TROUT.

| | | | |
|---|---|---|---|
| Arizona: | | | |
| Jerome, Beaver Creek | | | 2,000 |
| Dragoon Creek | | | 2,000 |
| Thompson Creek | | | 2,000 |
| West Fork Creek | | | 2,000 |
| Tucson, Sabino Creek | | | 15,000 |
| California: | | | |
| McCloud, Wheelers Creek | | 24,165 | |
| Point Reyes, Paper Mill Creek | 50,000 | | |
| Colorado: | | | |
| Antonito, Conejos River | | 20,000 | |
| Basalt, Luna Creek | | 25,000 | |
| Berrys Ranch, Eagle River | | | 7,000 |
| Black Hawk, Dory Lake | | 9,000 | |

[a] Lost in transit, 4,000 fry.

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Colorado—Continued. | | | |
| Breckenridge, Crystal Lake | | 30,000 | |
| Saw Mill Creek | | | 4,500 |
| Buena Vista, Cottonwood Creek | | 8,000 | |
| Middle Cottonwood Creek | | 16,000 | |
| South Cottonwood Creek | | 8,000 | |
| Cebolla, Cebolla Creek | | | 12,500 |
| East Elk Creek | | | 7,000 |
| Cimarron, Cimarron River | | 35,000 | |
| Silver Tip Lake | | 15,000 | |
| Van Place Lake | | 15,000 | |
| Colona, High Top Lake | | | 5,100 |
| Twin Lake | | | 10,200 |
| Wilson Lake | | | 5,100 |
| Colorado Springs, City Reservoir | | 30,000 | |
| Glimmer Glass Lake | | 20,000 | |
| Jimmy Camp Lake | | 27,500 | |
| North Cheyenne Creek | | | 6,000 |
| Creede, Red Mountain Creek | | 10,000 | |
| Rio Grande | | 10,000 | |
| Sylvester's ponds | | 10,000 | |
| Cripple Creek, Barnard Creek Pond | | | 1,500 |
| De Beque, Big Creek | | | 8,500 |
| West Bull Creek | | | 6,800 |
| Del Norte, Pinos River | | 10,000 | |
| Delta, Alexander Lake | | 100,000 | |
| Surface Creek | | 25,000 | |
| Youngs Creek | | 100,000 | |
| Denver, Crystal Springs Trout Hatchery | | 12,500 | |
| Eldora, Lake Eldora | | 30,000 | |
| Lake Kanawha | | 30,000 | 5,000 |
| Frisco, Uneva Lake | | 40,000 | |
| Georgetown, Green Lake | | 38,000 | |
| Glenwood Springs, Hermitage Creek | | 25,000 | |
| Mesa Creek | | 15,000 | |
| Roaring Fork River | | 25,000 | |
| Granby, East Inlet | | 12,000 | |
| Grand Lake | | 24,000 | |
| Grand River, North Fork | | 20,000 | |
| Stillwater Creek | | 16,000 | |
| Supply Creek | | 12,000 | |
| Grand Junction, West Evacuation Creek | | 15,000 | |
| Granger, Embargo Creek | | 12,500 | |
| Graneros, Oak Lodge Ponds | | | 3,000 |
| Grant, Duck Lake | | 15,000 | |
| Kirby Creek | | 15,000 | |
| Gunnison, Bird Lakes | | | 1,000 |
| Hillside, Koch Branch | | 10,000 | |
| Idaho Springs, Chinn Lake | | 15,000 | |
| Edith Lake | | 50,000 | |
| Saint Mary Lake | | 10,000 | |
| Silver Lake | | 10,000 | |
| Slater Lake | | 15,000 | |
| Truesdale Creek | | 18,000 | |
| Ivanhoe, Ivanhoe Creek | | 25,000 | |
| Lyle Creek | | 15,000 | |
| Jefferson, Rainbow Lake | | 15,000 | |
| La Jara, Hamilton Ranch Pond | | 8,000 | |
| La Jara River | | 19,950 | |
| Pursley's pond | | 10,000 | |
| Spring Creek | | 11,950 | |
| Leadville, Arkansas River | | 39,000 | |
| Austin's pond | | | 40 |
| Columbine Lake | | | 2,000 |
| Darrah's pond | | 20,000 | |
| Half Moon Creek | | 24,000 | |
| Lake Creek | | 24,000 | |
| Laws Lake | | | 20,000 |
| Lower Twin Lakes | | 25,000 | |
| Musgroves Pond | | 250,000 | |
| Smith's ponds | | 20,000 | |
| South Platte River | | 4,000 | |
| Tennessee River | | 44,000 | |
| Turquoise Lake | | 15,000 | |
| Twin Lakes | | 25,000 | |
| Upper Lake Creek | | 15,000 | |
| Willow Creek | | 44,000 | |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Colorado—Continued. | | | |
| Loveland, Big Thompson River, South Fork | | 30,000 | |
| Big Thompson Pond | | 15,000 | |
| Buckhorn Creek | | 15,000 | |
| Lyons, Estes Park Hatchery | 100,000 | | |
| Malta, Lake Creek | | 80,000 | |
| Marshall, South Boulder Creek | | 30,000 | |
| Minturn, Cross Creek | | | 13,600 |
| Eagle River | | | 11,900 |
| Gore Creek | | | 10,200 |
| Moffat, Artesia Pond | | | 2,000 |
| Monte Vista, Los Pinas Creek, Middle Fork | | 7,900 | |
| Rock Creek | | 12,500 | |
| South Fork Creek | | 16,000 | |
| Montrose, Middle Spring Creek | | 10,000 | |
| Spring Creek | | 15,000 | |
| Nast, Frying Pan River | | 20,000 | 15,000 |
| New Castle, Willow Creek | | | 4,000 |
| Norrie, Chapman Lake | | 15,000 | |
| Olathe, Greys Creek | | 10,000 | |
| Park Siding, South Platte River, North Fork | | 4,000 | |
| Parlin, Quartz Creek | | | 2,000 |
| Parshall, Grand River | | 20,000 | |
| Reads Lake | | 3,880 | |
| Radium, Grand River | | 20,000 | |
| Rico, Burnett Creek | | 10,000 | |
| Ryman Creek | | 10,000 | |
| Scotch Creek | | 15,000 | |
| Ridgway, Dolores River | | 28,500 | |
| Leopard Creek | | 15,000 | |
| Rifle, Bear Creek | | | 3,600 |
| White River | | | 1,800 |
| Ruedi, Pond Creek | | 10,000 | |
| Ruedi Lake | | 25,000 | |
| Spearhead Lake | | | 2,400 |
| Salida, South Arkansas River | | 28,000 | |
| Woodbridge Pond | | 40,000 | |
| Sawpit, Sylvan Lake | | | 6,700 |
| South Fork, Beaver Creek | | 12,500 | |
| Elk Creek | | 12,500 | |
| Goupel Creek | | 12,500 | |
| South Platte River | | | 22,500 |
| Trout Creek | | 12,500 | |
| Steamboat Springs, Bear River | | 25,000 | |
| Fish Creek | | 15,000 | |
| Spring Creek | | 10,000 | |
| Yampa River | | 15,000 | |
| Texas Creek, Spruce Creek Reservoir | | | 7,200 |
| Thomasville, Spring Creek | | | 2,400 |
| Woods Lake | | 200,000 | |
| Tolland, South Boulder Creek | | 23,000 | |
| Trinidad, McWilliams Pond | | | 4,000 |
| South Lake | | | 10,000 |
| Twin Lakes, Lake Creek | | | 5,000 |
| Webster, Platte River | | | 16,500 |
| West Cliffe, De Weese Reservoir | | 98,000 | |
| Venable Creek | | | 10,800 |
| Wheeler, Black Creek | | 15,000 | |
| Wolcott, Eagle Creek | | | 6,000 |
| Wootton, Sugarite Creek | | | 2,000 |
| Connecticut: | | | |
| Botsford, Halfway River | | 12,000 | |
| Danbury, Willow Brook | | | 300 |
| Greenwich, Byram River | | 8,000 | |
| New Haven, Spring Glen Pond | | | 300 |
| Norwich, Billings Brook | | | 400 |
| Broad Brook | | | 600 |
| Choate Brook | | 7,500 | |
| Pease Brook | | 7,500 | |
| Stony Brook | | 7,500 | |
| Saybrook Junction, Hart Brook | | | 300 |
| Stamford, Mill Creek | | 20,000 | |
| Rippewan River | | 30,000 | |
| Stratford, Brookdale Pond | | 12,000 | |
| Tariffville, Three Cornered Pond | | 16,000 | |
| Waterbury, Andrews Pond | | 32,000 | |
| Hancock Pond | | 12,000 | |
| Hop Brook | | 16,000 | |

## Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Connecticut—Continued. | | | |
| Waterbury, Long Hill Brook | | 16,000 | ..... |
| Osborne Brook | | 8,000 | ..... |
| Potatuck River | | 8,000 | ..... |
| Wilton, Norwalk River | | 23,000 | ..... |
| Delaware: | | | |
| Wilmington, Brandywine Creek | | | 4,000 |
| Georgia: | | | |
| Rabun Gap, Denton Creek | | | 2,400 |
| Young Harris, Brasstown Creek | | | 4,000 |
| Idaho: | | | |
| Bancroft, Eighteenmile Creek | | | 1,800 |
| Blackfoot, Tanner Spring Lakes | | | 1,200 |
| Bonners, Spring Creek Pond | | | 3,000 |
| Buhl, Sand Spring Lake | | | 1,000 |
| Caldwell, Meyer Lake | | | 900 |
| Garner, Clifton Mill Pond | | | 900 |
| Hailey, Hartley Pond | | | 900 |
| Sheep Pond | | | 900 |
| Spring Creek | | | 2,000 |
| Hayden Lake, Hayden Lake | | | 6,000 |
| Jerome, Trail Springs | | | 1,500 |
| Kamiah, Little Duck Lake | | | 2,000 |
| Kingston, Pine Creek | | | 6,000 |
| Malad City, Waldon's pond | | | 1,200 |
| Montpelier, Mildred Pond | | | 1,200 |
| Naples, Fall Creek | | | 4,500 |
| Preston, Wilson Spring Pond | | | 1,200 |
| Rathdrum, Boeck Creek | | | 1,500 |
| Fish Lake Creek | | | 2,000 |
| Gilbert Creek | | | 1,500 |
| Lancaster Creek | | | 2,000 |
| Miller Creek | | | 1,500 |
| Rice Creek | | | 1,500 |
| Thorp Creek | | | 2,000 |
| Rexburg, Bell's pond | | | 600 |
| Illinois: | | | |
| Fox, Crystal Springs | | | 300 |
| Griggsville, Hatch Hollow Pond | | | 300 |
| Indiana: | | | |
| Angola, Clark Creek | | | 1,950 |
| Jackson Creek | | | 2,000 |
| Sauls Creek | | | 1,950 |
| Richmond, Henley Pond | | | 1,000 |
| St. Paul, Mill Creek | | | 3,950 |
| Iowa: | | | |
| McGregor, Bass Creek | | | 6,000 |
| Waukon, North Fork Creek | | | 6,000 |
| Patterson Creek | | | 7,500 |
| Kentucky: | | | |
| Compton Junction, Chimney Top Creek | | | 10,000 |
| Maine: | | | |
| Alfred, Nutter Brook | | | 500 |
| Annabessacook, Wilson Lake | | 30,000 | ..... |
| Belfast, Swan Lake | | 30,000 | ..... |
| Biddeford, Buzzell Brook | | 20,000 | ..... |
| Cold Spring Brook | | 15,000 | ..... |
| Runnells Brook | | 20,000 | ..... |
| Bingham, Pleasant Pond | | | 1,800 |
| Rowe Ponds | | 21,500 | 1,500 |
| Bluehill, Woods Pond | | 25,000 | ..... |
| Brooks, Passachunkeag Pond | | 30,000 | ..... |
| Bryants Pond, Lake Christopher | | | 1,500 |
| Camden, Canaan Lake | | 30,000 | 1,500 |
| Dedham, Green Lake | | 80,000 | ..... |
| Deering Junction, Bodge Brook | | 15,000 | 600 |
| Machigonne Creek | | 15,000 | 750 |
| Woodland Hatchery | 25,000 | ..... | ..... |
| East Orland, Toddy Pond | | 21,000 | ..... |
| Ellsworth, Billings Pond | | 35,000 | ..... |
| Branch Pond | | 50,000 | ..... |
| Ellsworth Falls, Beach Hill Pond | | 20,000 | ..... |
| Floods Pond | | 25,000 | ..... |
| Long Pond | | 37,500 | ..... |
| Farmington, Beedy Brook | | | 900 |
| Big Island Pond | | | 1,500 |
| Cattle Brook | | | 600 |
| Chace Pond | | | 1,500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Maine—Continued. | | | |
| Farmington, Chain of Ponds | | | 3,000 |
| Dead River Pond | | | 1,500 |
| Grant Pond | | | 1,500 |
| Gull Pond | | | 1,600 |
| Lufkin Pond | | | 1,500 |
| Mt. Blue Pond | | | 3,000 |
| Redington Creek | | | 1,500 |
| Sandy River | | | 1,500 |
| Tufts Pond | | | 1,400 |
| Green Lake, Ducktail Pond | | 20,000 | |
| Partridge Pond | | 25,000 | |
| Snowshoe Pond | | 15,000 | |
| Greenville Junction, Moosehead Lake | | | 1,500 |
| Harrington, Schoodic Lake | | 35,000 | |
| Holeb, Little Pond | | | 1,500 |
| Jackman, Hatchery Brook | | 15,000 | |
| Supply Pond | | 15,000 | 1,500 |
| Thompson Brook | | 15,000 | |
| Katahdin Iron Works, Big Houston Pond | | | 1,500 |
| Little Houston Pond | | 35,000 | 3,500 |
| Kineo, Cany Creek | | 30,000 | |
| Moosehead Lake | | 37,500 | 4,500 |
| Lincoln, Long Pond | | 20,000 | |
| Livermore Falls, Long Pond | | | 1,500 |
| Lowelltown, Bog Brook | | 12,500 | |
| Deer Pond | | 12,500 | |
| Lowell Pond | | 12,500 | |
| Machias, Bog Lake | | 30,000 | |
| Monmouth, Baker Pond | | | 1,500 |
| Jimmy Pond | | | 1,500 |
| Mosquito, Baker Pond | | 10,000 | |
| Onawa, Upper Boarstone Pond | | 15,000 | |
| Oquossoc, Rangeley Lakes | | | 2,250 |
| Otis, Green Lake | | 100,000 | |
| Oxford, Hall Pond | | | 1,200 |
| Perry, Boyden Lake | | 40,000 | |
| Phillips, Carlton Pond | | 37,500 | |
| Philips Lake, Philips Lake | | 40,000 | |
| Portage, Portage Lake | | | 2,100 |
| Rumford Falls, Howard Pond | | | 1,500 |
| Sedgwick, Thurston Brook | | | 600 |
| South Paris, Pennesseewassee Lake | | 17,500 | |
| Shagg Pond | | | 1,500 |
| Washburn Pond | | 15,000 | |
| Tunk Pond, Tunk Pond | | | 1,500 |
| Unity, Sandy Creek | | 30,000 | |
| West Ellsworth, Pattens Pond | | 25,000 | |
| West Paris, Abbot Pond | | | 1,200 |
| Little Concord Pond | | | 1,500 |
| Washburn Pond | | | 600 |
| Wilton, Webb Pond | | 17,500 | |
| York Beach, Otter Pond | | | 450 |
| Maryland: | | | |
| Annapolis, Alcorn Branch | | | 1,000 |
| Bel Air, Barnes Run | | | 2,000 |
| Cool Spring Run | | | 1,000 |
| Durham's brook | | | 500 |
| Elbow Brook | | | 1,000 |
| Flint Mill Brook | | | 1,000 |
| Graveyard Brook | | | 1,000 |
| Hollands Brook | | | 1,000 |
| Johnson's brook | | | 1,000 |
| Stoner Creek | | | 1,000 |
| Wysong Brook | | | 500 |
| Deer Park, Altamont Pond | | | 500 |
| Block Run | | | 400 |
| Pond Run | | | 500 |
| Trout Run | | | 800 |
| Elkridge, Stony Run | | | 1,000 |
| Fallston, South Fork Brook | | | 1,000 |
| Glyndon, Lake Jorosa | | | 500 |
| Hagerstown, Marsh Run | | | 1,000 |
| Mill Spring Run | | | 500 |
| Highland, Heaps Brook | | | 500 |
| Minefield Brook | | | 1,000 |
| Ramsey Brook | | | 1,000 |
| Hutton, Crystal Lake | | | 2,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Maryland—Continued. | | | |
| Landover, Eccles Pond | | | 500 |
| Monkton, Curtis Brook | | | 1,000 |
| Matthews Branch | | | 500 |
| Patterson Brook | | | 500 |
| Phelps and Reynolds Branch | | | 500 |
| Mountain Lake Park, Pine Run | | | 500 |
| New Freedom, Ruhls Branch | | | 1,000 |
| Oakland, Cherry Creek | | | 1,500 |
| Deep Creek | | | 2,200 |
| Dunker Lick Creek | | | 1,800 |
| Hamill's lake | | | 1,000 |
| Harrington Creek | | | 2,300 |
| Harvey's pond | | | 320 |
| Millers Run | | | 1,800 |
| Wilsons Lake | | | 500 |
| Rockland Station, Green Springs Run | | | 1,000 |
| Ruxton, Rockland Creek | | | 1,000 |
| Sharon, Magnes Brook | | | 500 |
| Smithsburg, Oswald Run | | | 500 |
| Silver Falls Creek | | | 500 |
| Warner Gap Run | | | 500 |
| Stoyer, Sand Run | | | 400 |
| Thurmont, Hunting Creek | | | 1,500 |
| Westminster, Fairview Pond | | | 500 |
| Wilson, Laurel Run | | | 1,500 |
| Massachusetts: | | | |
| Athol, Swift River | | 20,000 | |
| Clinton, Nashua River | | | 600 |
| Concord, Punkatasset Pond | | 16,000 | |
| Fitchburg, Lord Brook | | | 600 |
| Mulpus Brook | | | 900 |
| Greenfield, Fisk Pond | | | 500 |
| Groton, Hunkerty Brook | | | 600 |
| Holyoke, Man Han River | | | 700 |
| Williamsett Brook | | | 300 |
| Lawrence, Schubert's pond | | 4,000 | |
| North Adams, Hoosac River, North Branch | | | 500 |
| Hudson Brook | | | 500 |
| Northampton, Running Gutter Creek | | | 700 |
| South Hanson, Poors Creek | | 12,000 | 500 |
| Tolland, Slocum Brook | | | 1,200 |
| Waltham, Pequod Brook | | 8,000 | |
| School House Brook | | 8,000 | |
| Westfield, Big Powder Mill Brook | | | 500 |
| Farmington River, East Branch | | | 1,400 |
| Little River | | | 700 |
| Powder Mill Brook | | | 500 |
| Weston, Draper Brook | | | 300 |
| West Townsend, Allison's pond | | | 180 |
| Williamsburg, Clary Pond | | | 300 |
| Highland Brook | | | 300 |
| Michigan: | | | |
| Addison, Posy Creek | | | 3,000 |
| Alger, Bear Creek | | 5,000 | |
| Wells Creek | | 10,000 | |
| Alpena, Davis Creek | | 12,000 | |
| Newton Creek | | 9,000 | |
| Watson Creek | | 9,000 | |
| Widner Creek | | 12,000 | |
| Baldwin, Baldwin Creek | | 15,000 | |
| Battle Creek, Sevenmile Brook | | | 3,000 |
| Bellaire, Shanty Creek | | | 3,000 |
| Bitely, Marquette River | | | 3,000 |
| Branch, Weldon Creek | | 10,000 | |
| Brighton, Ore Creek | | 12,000 | |
| Calumet, Eagle Creek | | | 6,000 |
| Mosquito Creek | | | 4,000 |
| Central Lake, Central Lake Brooks | | | 3,000 |
| Clare, Tobacco River, North Branch | | 18,000 | |
| East Tawas, Vaughn Creek | | | 1,000 |
| Gladwin, Cedar River | | 15,000 | |
| Smith Creek | | 10,000 | |
| Grand Marais, Grand Marais Creek | | | 10,000 |
| Greenville, Berridges Creek | | | 2,000 |
| Hale, Hale Creek | | 9,000 | |
| Smith Creek | | 9,000 | |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Michigan—Continued. | | | |
| Hillsdale, Kirby Brook | | | 3,000 |
| Holland, Half Way Creek | | 6,000 | |
| Interlochen, Betsie River | | | 3,000 |
| Kalamazoo, Haden Brook | | 15,000 | |
| Silver Creek | | 12,000 | |
| Kingsley, Boardman River | | | 2,000 |
| East Creek | | | 2,000 |
| Mayfield Brook | | | 2,000 |
| Little Manistee, Little Manistee River | | 20,000 | |
| Lovells, Au Sable River, North Branch | | 25,000 | |
| Big Creek | | 20,000 | |
| Crapo Creek | | 10,000 | |
| Mandan, Montreal River | | | 6,000 |
| Millersburg, Indian Creek | | 12,000 | |
| Little Ocqueoc River | | 15,000 | |
| Ocqueoc River | | 15,000 | |
| Muskegon, Cedar Creek | | 12,000 | |
| Silver Creek | | 9,000 | |
| Newaygo, Bigton Creek | | 12,000 | |
| Northville, Townsend Creek | | 10,000 | |
| Peacock, Au Sable River | | | 3,000 |
| Manistee River | | | 10,000 |
| Petersburg, Crystal Pond | | | 6,000 |
| Phoenix, Gratiot River | | | 6,000 |
| Roscommon, Barnes Creek | | 5,000 | |
| Beaver Creek | | 5,000 | |
| Cedar Creek | | 5,000 | |
| Cold Creek | | 15,000 | |
| Durant Creek | | 10,000 | |
| Willow Creek | | 5,000 | |
| Standish, Lundy Creek | | | 6,000 |
| Sweetwater, Sweetwater Creek | | | 4,000 |
| White Cloud, White River | | | 4,000 |
| Wingleton, Bowman Creek | | | 4,000 |
| Cedar Creek | | | 4,000 |
| Danahar Creek | | 15,000 | |
| Minnesota: | | | |
| Alborn, Ericsson Creek | | | 600 |
| Beaver Crossing, Beaver Creek | | | 10,000 |
| Budd Creek | | | 4,000 |
| Little Split Rock River | | | 4,000 |
| Split Rock River | | | 9,200 |
| Split Rock River, East Branch | | | 6,000 |
| Canton, Weisel Creek | | | 5,300 |
| Carlton, Otter Creek | | | 10,000 |
| Cloquet, Otter Creek | | | 6,000 |
| Squaw Creek | | | 6,000 |
| Deephaven, Jennison Creek | | | 900 |
| Kokesh Creek | | | 2,000 |
| Duluth, Endion Brook | | | 12,000 |
| Lester Creek, East Branch | | | 6,000 |
| Temperance River | | | 1,200 |
| Fond du Lac, Mission Creek | | | 4,000 |
| Fosston, Poplar Lake | | | 10,000 |
| Hibbing, O'Brien Brook | | | 800 |
| Hovland, Upper Brule River | | | 7,500 |
| Knife River, Micmac Lake | | | 10,000 |
| Mountain Brook | | | 6,000 |
| Nigadoo Brook | | | 4,000 |
| Lewiston, Enterprise Creek | | | 2,000 |
| Gunther Valley Creek | | | 600 |
| Hemmingway Creek | | | 2,400 |
| Laufenbergs Valley Creek | | | 400 |
| Pine Creek | | | 2,000 |
| Rush Creek | | | 2,400 |
| Stockton Valley Creek | | | 2,000 |
| Whitestone Creek, Middle Branch | | | 600 |
| Whitewater Creek, South Branch | | | 2,800 |
| Little Falls, Hillman Creek | | | 10,000 |
| Okesippi Creek | | | 8,000 |
| Skunk Creek | | | 10,000 |
| Minnesota City, Bear Creek | | | 2,000 |
| Rollingstone Creek, North Branch | | | 2,000 |
| Rollingstone Creek, Rupprecht Valley Branch | | | 2,000 |
| Preston, Bear Creek | | | 2,000 |
| Camp Creek | | | 2,000 |
| Forestville Creek, North Branch | | | 1,000 |
| Forestville Creek, South Branch | | | 2,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Minnesota—Continued. | | | |
| Preston, Partridge Creek | | | 1,000 |
| Sugar Creek | | | 1,500 |
| Watson Creek | | | 2,000 |
| Redwood, Schmidts Creek | | | 400 |
| Rochester, Bear Creek | | | 1,000 |
| Rollins Siding, Bates Creek | | | 4,000 |
| Pine Creek | | | 4,000 |
| Rushford, Big Spring Creek | | | 1,000 |
| Camp Creek | | | 1,000 |
| Choice Creek | | | 1,000 |
| Coolidge Creek | | | 1,000 |
| Dalleys Creek | | | 1,000 |
| Diamond Creek | | | 1,000 |
| Ensend Creek | | | 1,000 |
| Enterprise Creek | | | 1,000 |
| Ferguson Creek | | | 1,000 |
| Gribbin Creek | | | 1,000 |
| Hemingway Creek | | | 1,000 |
| Iverson Creek | | | 1,000 |
| Jansens Creek | | | 1,000 |
| Johnson Creek | | | 1,000 |
| Meade Creek | | | 1,000 |
| Onstine Creek | | | 1,000 |
| Opheim Creek | | | 1,000 |
| Overland Creek | | | 1,000 |
| Paterson Creek | | | 1,000 |
| Pine Creek | | | 1,000 |
| Tangen Creek | | | 1,000 |
| Voagen Creek | | | 1,000 |
| Wilson Creek | | | 1,000 |
| Wiscoy Creek | | | 1,000 |
| Saginaw, Demsey Creek | | | 4,000 |
| St. Charles, Campbells Spring Branch | | | 1,000 |
| Carters Run | | | 1,500 |
| Crows Creek | | | 1,500 |
| Drakes Creek | | | 1,000 |
| Fays Run | | | 1,000 |
| Logan Branch | | | 400 |
| Nichols Spring Branch | | | 400 |
| Pine Creek | | | 2,000 |
| Trout Run | | | 2,000 |
| Whitewater River | | | 6,000 |
| Savage, Nine Mile Creek | | | 4,500 |
| Two Harbors, Encampment River | | | 800 |
| Winona, Big Pickwick Creek | | | 400 |
| Cedar Creek | | | 1,400 |
| Corey Valley Creek | | | 1,000 |
| Dabelstein's ponds | | | 800 |
| East Burns Valley Creek | | | 400 |
| Ferguson Creek | | | 400 |
| Gilmore Valley Creek | | | 1,000 |
| Harvey Valley Creek | | | 1,000 |
| Hicks Valley Creek | | | 1,600 |
| Laufenberger Creek | | | 1,000 |
| Little Pickwick Creek | | | 600 |
| Marey Creek | | | 1,000 |
| Middle Valley Creek | | | 400 |
| Nunny Coulee Creek | | | 600 |
| Pine Creek | | | 600 |
| Pleasant Valley Creek | | | 1,600 |
| Rollingstone Creek | | | 1,000 |
| Rupprecht Valley Creek | | | 600 |
| Speltz Valley Creek | | | 1,400 |
| Straight Valley Creek | | | 1,000 |
| West Bruce Valley Creek | | | 2,000 |
| West Burns Valley Creek | | | 400 |
| Wiscoy Creek | | | 1,000 |
| Missouri: | | | |
| St. Joseph, Missouri Fish Commission | 100,000 | | |
| Montana: | | | |
| Alder, Moran Pond | | | 1,200 |
| Anaconda, Warm Springs Creek | | | 2,800 |
| Warm Springs Pond | | | 1,600 |
| Basin, Cataract Creek | | | 22,500 |
| Belt, Little Belt Creek | | | 3,500 |
| Belton, Fish Creek | | | 2,000 |
| Big Timber, Big Timber Creek | | | 12,000 |
| Boulder, Buffalo Creek | | | 2,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Montana—Continued. | | | |
| Bozeman, Beaver Creek | | | 4,000 |
| Bridger Creek | | | 36,000 |
| Kelly Creek | | | 2,000 |
| Butte, Canty's pond | | | 2,000 |
| Nez Perce Pond | | | 2,000 |
| White's lake | | | 6,000 |
| Chinook, Clear Creek | | | 3,500 |
| Columbus, Deep Creek | | | 15,000 |
| East Rosebud Creek | | | 18,000 |
| Fishtail Creek | | | 1,500 |
| Little Rosebud Creek | | | 1,500 |
| Skeleton Creek Pond | | | 2,000 |
| Spring Creek | | | 2,000 |
| Stillwater River | | | 2,000 |
| Crabtree, Spring Creek | | | 1,500 |
| Deer Lodge, Dog Creek | | | 3,500 |
| Dillon, Carter Creek | | | 1,800 |
| Landons Creek | | | 600 |
| Murray Spring Creek | | | 4,000 |
| Poindexter Creek | | | 1,800 |
| Dodson, Lodge Pole Creek | | | 5,500 |
| Emigrant, Dailey Lake | | | 2,000 |
| Helena, Papoose Creek | | | 7,500 |
| Hobson, Crescent Pond | | | 2,000 |
| Galbreath Coulee Lake | | | 2,000 |
| Lennep, Comb Creek | | | 9,000 |
| Lewistown, Arnell Creek | | | 4,000 |
| Box Elder Creek | | | 4,000 |
| Flat Willow Creek | | | 3,000 |
| Lima, Little Sheep Creek | | | 1,500 |
| Livingston, Holliday Spring Creek | | | 9,000 |
| Moore, Jones Spring | | | 3,000 |
| Sheridan, Branham Lake | | | 2,800 |
| Straw, East Buffalo Creek | | | 9,000 |
| Toston, Spring Creek Lake | | | 7,500 |
| Victor, Bear Creek | | | 5,000 |
| Big Creek | | | 5,000 |
| Sweathouse Creek | | | 5,000 |
| White Pine, Little Beaver Creek | | | 2,000 |
| Spring Lake | | | 1,500 |
| Winston, Staubach Creek | | | 4,000 |
| Nebraska: | | | |
| Chadron, Bordeaux Creek | | | 15,000 |
| Dead Horse Creek | | | 30,000 |
| Creighton, Bayile Creek | | | 600 |
| Nevada: | | | |
| Reno, Truckee River | | | 3,600 |
| New Hampshire: | | | |
| Ashland, Squam Lake | | 16,000 | |
| Berlin, Chickwelnepy Creek | | 30,000 | |
| Munn Pond | | 40,000 | |
| Success Pond | | 40,000 | |
| Bradford, Mountain Brook | | 12,000 | |
| Campton, Bee Bee River | | 20,000 | |
| Charlestown, Benware Brook | | | 1,500 |
| Hassom Brook | | | 1,500 |
| Mill Brook | | | 1,500 |
| Concord, Black Brook | | 8,000 | |
| Bon Bog Brook | | 12,000 | |
| Bow Brook Pond | | 8,000 | |
| Bridge Brook | | 4,000 | |
| Brown Brook | | 8,000 | |
| Bumfogen Brook | | 16,000 | |
| Deer Meadow Brook | | 8,000 | |
| Monument Brook | | 8,000 | |
| Pickard Brook | | 8,000 | |
| Pine Island | | 12,000 | |
| Trap Brook | | 12,000 | |
| Enfield, Lovejoy Brook | | 12,000 | |
| Epsom, Mountain Brook | | 8,000 | |
| Exeter, Meadow Brook | | | 180 |
| Grafton, Wildmeadow Pond | | | 220 |
| Greenville, Shattuck Brook | | | 180 |
| Halcyon, Tilton Brook | | 6,000 | |
| Keene, Aistead Brook | | 16,000 | |
| Ashuelot River, East Branch | | 20,000 | |

## Details of Distribution of Fish and Fish Eggs—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| New Hampshire—Continued. | | | |
| Laconia, Follett Brook | | 6,000 | |
| Gilford Brook | | 12,000 | |
| Lebanon, Cranberry Pond | | 8,000 | |
| Lisbon, Star Crescent Pond | | 20,000 | |
| Madison, Silver Lake | | 5,000 | |
| Manchester, Dalton Brook | | | 180 |
| Manter Brook | | 12,000 | |
| Nigger Creek | | 8,000 | |
| Prescott Brook | | | 180 |
| Nashua, Budro Brook | | 6,000 | |
| Chase Brook | | | 180 |
| Cider Mill Brook | | 8,000 | |
| Gibson Brook | | 12,000 | |
| Newbury, Lake Sunapee | | | 6,000 |
| New London, Barber Brook | | 6,000 | |
| Newport, Cutts Brook | | | 1,000 |
| Penacook, Brickyard Brook | | 6,000 | |
| Tannery Brook | | 6,000 | |
| Peterboro, Nay Brook | | 12,000 | |
| Pike, Eastman Brook | | | 500 |
| Plymouth, Little Glen Ponds | | 48,000 | |
| Portsmouth, Marston Brook | | 8,000 | |
| Peverly Brook | | | 250 |
| Potter Place, Fellows Meadow Brook | | 6,000 | |
| Raymond, Fordway Brook | | | 180 |
| Jose Dudley Brook | | | 180 |
| Pine Hill Brook | | | 180 |
| Scribner Brook | | | 180 |
| Sanbornville, Pike Brook | | 16,000 | |
| South Brookline, Rockwood Pond | | 8,000 | |
| South Lyndeboro, Herrick Brook | | | 180 |
| Warner, Meadow Mills Creek | | 8,000 | |
| Stevens Hill Creek | | 12,000 | |
| Wentworth, Baker River | | 8,000 | |
| Wilton, Miller Brook | | 12,000 | |
| Purgatory Brook | | 16,000 | |
| Stony Brook | | 12,000 | |
| Winchester, Willard Pond | | | 1,000 |
| Wolfeboro, Haith Brook | | 12,000 | |
| New Jersey: | | | |
| Elberon, Whalepond Brook | | | 1,000 |
| Passaic, McDaniels Brook | | | 1,000 |
| Pattenburg, Manunselocwa Creek | | | 1,000 |
| Pompton Lakes, Haycock Brook | | | 1,000 |
| Princeton, applicant | 1,000 | | |
| Salem, Collins Run | | | 1,500 |
| Cool Run | | | 1,500 |
| Easter Run | | | 1,500 |
| South Ogdenburg, Kinney Brook | | | 500 |
| Sparta, Pullis Stream | | | 500 |
| Sherman Mine Brook | | | 500 |
| New Mexico: | | | |
| Alamogordo, Spring Canon Pond | | | 5,000 |
| Glorieta, El Reto de la Arrhaw | | | 2,000 |
| Las Vegas, Sapello River | | | 4,000 |
| Santa Fe, Rio Grande Live Stock Co.'s lake | | | 2,000 |
| Rio del Medio Creek | | | 3,200 |
| Santa Fe River | | | 2,000 |
| Tesuque Creek | | | 2,000 |
| Silver City, Glenwood Pond | | | 4,000 |
| Glenwood Springs | | | 5,000 |
| Wagon Mound, Tison Creek | | | 1,600 |
| New York: | | | |
| Adams, South Sandy Creek | | 24,000 | |
| Afton, Cady Creek | | | 500 |
| Cornell Creek | | | 500 |
| North Afton Brook | | | 1,000 |
| Pixly Brook | | | 1,000 |
| Altmar, Beaver Dam Brook | | 12,000 | |
| Potts Mill Brook | | 16,000 | |
| Salmon River | | 24,000 | |
| Apulia Station, Cascade Brook | | | 1,500 |
| Cold Brook | | | 500 |
| Conklin Brook | | | 1,000 |
| Dodge Brook | | | 1,500 |
| Gallinger Brook | | | 600 |
| Gleason Brook | | | 1,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| New York—Continued. | | | |
| Apulia Station, Grady Brook | | | 600 |
| Johnson Brook | | | 6,000 |
| June Brook | | | 1,500 |
| Keeler Brook | | | 1,000 |
| Lee Brook | | | 1,000 |
| Newman Brook | | | 1,000 |
| Osborne Brook | | | 1,000 |
| Auburn, North Brook | | 20,000 | |
| Salmon Brook | | 24,000 | |
| Sennett Brook | | 20,000 | |
| Barneveld, Big Drumlin Pond | | 12,000 | |
| Beaver River, Beaver River | | 12,000 | |
| Twitchell Creek | | 24,000 | |
| Bellport, Osborne Creek | | | 500 |
| Berlin, Little Hoosick River | | 16,000 | |
| Bliss, Wiscoy Creek | | 16,000 | |
| Wiscoy Creek, North Branch | | 8,000 | |
| Blossvale, Fish Creek | | 20,000 | |
| Brainard, Black Brook | | 8,000 | |
| Budlong Brook | | 6,000 | |
| Buffalo, New York State Cancer Laboratory | | | 250 |
| Cambridge, Blair Brook | | 12,000 | |
| Pammanook Creek | | 8,000 | |
| Rice Brook | | 8,000 | |
| Canton, Baldwin Brook | | 8,000 | |
| Buck Brook | | 8,000 | |
| Clark Brook | | 8,000 | |
| Dean Brook | | 8,000 | |
| Giffin Brook | | 8,000 | |
| Granis Brook | | 6,000 | |
| Howard Brook | | 8,000 | |
| Leonard Brook | | 16,000 | |
| Little River | | 16,000 | |
| McFadden Brook | | 12,000 | |
| Pleasant Brook | | 8,000 | |
| Taylor Brook | | 12,000 | |
| Cattaraugus, Cattaraugus Creek, West Branch | | 12,000 | |
| Central Bridge, Grosvenor Pond | | | 500 |
| Cincinnatus, Brakel Creek | | | 1,500 |
| Cooperstown, Iroquois Farm Ponds | | | 600 |
| Corinth, Sturdevan Brook | | 12,000 | |
| Cornwell, Mineral Spring Creek | | | 1,000 |
| Dryden, Virgil Creek | | | 1,500 |
| Edmeston, Wharton Creek | | | 2,000 |
| Floodwood, Ledge Pond | | 24,000 | |
| Georgetown Station, Gladding Brook | | | 500 |
| Mann Brook | | | 1,000 |
| Mariposa Creek | | | 1,000 |
| Middletown Creek | | | 1,000 |
| Plank Creek | | | 600 |
| Thompson Brook | | | 600 |
| Greene, Crandall Brook | | | 1,000 |
| Highland Falls, Queensboro Creek | | | 1,500 |
| Hoosick Falls, Case Brook | | 8,000 | |
| Shingle Hollow Creek | | 12,000 | |
| White Creek | | 16,000 | |
| Iona Island, Doodletown Brook | | | 1,000 |
| Livingston Manor, Beaverkill River | | 10,000 | |
| Elmore Lake | | 7,500 | |
| Mahopac, Hillsboro Lake | | | 2,500 |
| Marathon, Hunts Creek | | | 1,000 |
| Merrills Creek | | | 1,500 |
| Newark, Military Brook Pond | | 8,000 | |
| New Lebanon, Burnemead Brook | | 6,000 | |
| Church Brook | | 6,000 | |
| Cold Spring Brook | | 6,000 | |
| Gillett Brook | | 8,000 | |
| Hosmer Brook | | 8,000 | |
| Hull Brook | | 8,000 | 150 |
| Lost Brook | | 8,000 | |
| Mahar Brook | | 6,000 | |
| Meadow Brook | | 8,000 | |
| Meander Brook | | 4,000 | |
| Parker Brook | | 8,000 | |
| Queechy Road Brook | | 8,000 | |
| Shaker Mill Brook | | 16,000 | 150 |
| Thomas Brook | | | 150 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| New York—Continued. | | | |
| New Lebanon, Tilden Brook | | | 150 |
| West Meadow Brook | | 8,000 | |
| Wyomonock Creek | | | 500 |
| New York, New York Aquarium | 10,000 | | |
| Northville, Barkers Stream | | 16,000 | |
| Onativia, Hiscock Brook | | | 1,000 |
| Kennellys Brook | | | 1,000 |
| Morgan Brook | | | 2,000 |
| Montgomery Brook | | | 1,000 |
| Oneonta, Butternut Creek | | | 2,500 |
| Otsego Creek | | | 1,500 |
| Ouleous Creek | | | 2,000 |
| Otego, Otsdawa Creek | | | 1,000 |
| Paul Smiths, Lower St. Regis Lake | | 18,000 | |
| Patterson, Croton River | | | 2,500 |
| Quaker Brook | | | 2,500 |
| Prospect, Big Rock Lake | | 24,000 | |
| Randolph, Little Conewango Creek | | 16,000 | |
| Rome, Canada Creek | | 16,000 | |
| Point Rock Creek | | 16,000 | |
| Roscoe, Abewood Brook | | 5,000 | |
| Appley Brook | | 5,000 | |
| Beaverkill River | | 7,500 | |
| Berry Brook | | 6,000 | |
| Darbee Brook | | 5,000 | |
| Shin Brook | | 5,000 | |
| Stewart Brook | | 5,000 | |
| Tennanah Lake | | 10,000 | |
| Willowemoc River | | 13,500 | |
| Salamanca, Stoddards Pond | | 8,000 | |
| Saugerties, Dwaskill Creek | | | 2,000 |
| Swartzwood, Jackson Hollow Creek | | | 1,800 |
| Syracuse, Carpenter Brook | | 16,000 | |
| De Montforde Creek | | 8,000 | |
| Thurman, Millington Brook | | 8,000 | 6,000 |
| Veli Pond | | 20,000 | |
| Valley Stream, Trout Lake | | | 1,000 |
| Watertown, French Creek | | 4,000 | |
| Kings Creek | | 4,000 | |
| Knapp Creek | | 6,000 | |
| Waterville, Oriskany Creek | | 8,000 | |
| Townsend Creek | | 10,000 | |
| Williamstown, Carterville Pond | | 24,000 | |
| Willsboro, Warm Pond | | 24,000 | |
| North Carolina: | | | |
| Addie, Scotts Creek | | | 3,200 |
| Apalachia, Cane Creek | | | 4,800 |
| Sular Creek | | | 4,000 |
| Balsam, Dark Ridge Creek | | | 1,600 |
| Woodfin Creek | | | 1,600 |
| Black Mountain, Long Branch Creek | | | 500 |
| Middle Fork Creek | | | 1,000 |
| Montreat Lake | | | 2,500 |
| Silver Fork | | | 2,000 |
| Sugar Creek | | | 1,000 |
| Swannanoa River, North Fork | | | 2,000 |
| Boonford, Ayles Creek | | | 1,500 |
| Cane River, Elk Fork | | | 1,000 |
| Brevard, Middlesex Branch | | | 4,000 |
| Craggy, Wells's pond | | | 800 |
| Dillsboro, Brushyfork Creek | | | 1,600 |
| Elk Park, Elk River | | | 2,400 |
| Hickory Creek | | | 2,400 |
| Winkler Creek | | | 6,400 |
| Glenwood, Goose Creek | | | 500 |
| Mashburn Creek | | | 500 |
| Greenlee, Bear Creek | | | 1,000 |
| Bobs Fork Creek | | | 1,000 |
| Graybeard Creek | | | 1,000 |
| Greenlee Fork Creek | | | 1,000 |
| Haw Branch | | | 1,000 |
| Huskins Creek | | | 1,000 |
| Jarretts Creek | | | 1,000 |
| Little Shoals Creek | | | 1,000 |
| Logan Creek | | | 500 |
| Lone Fork Creek | | | 500 |
| Mountain Creek | | | 1,000 |
| Nahlets Creek | | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| North Carolina—Continued. | | | |
| Greenlee, Pool Creek | | | 500 |
| Rock House Creek | | | 500 |
| She Bear Creek | | | 1,000 |
| Simmons Creek | | | 1,000 |
| Still House Creek | | | 500 |
| Teamster Creek | | | 500 |
| Thompson Fork Creek | | | 1,000 |
| Wild Cat Falls Creek | | | 1,000 |
| Wolf Creek | | | 1,000 |
| Hendersonville, Foley Creek | | | 3,200 |
| Kellerville, Beech Creek | | | 14,000 |
| Buckeye Creek | | | 10,000 |
| Linville Falls, Catawba River, North Fork | | | 2,000 |
| Green Mountain Branch | | | 500 |
| North Cove Creek | | | 1,500 |
| Pine Branch | | | 500 |
| Marion, Bee Rock Creek | | | 1,000 |
| Chalk Brook | | | 500 |
| Fourmile Creek | | | 1,000 |
| Garden Creek | | | 1,000 |
| Georges Creek | | | 1,000 |
| Greasey Creek | | | 500 |
| Honeycutte Creek | | | 1,000 |
| Jake Creek | | | 1,000 |
| Limekiln Creek | | | 1,000 |
| Little Buck Creek | | | 1,000 |
| Lost Cove Creek | | | 1,000 |
| Mill Creek | | | 1,000 |
| Osborne Creek | | | 1,000 |
| Paxton Creek | | | 1,000 |
| Rag Creek | | | 1,000 |
| Stott Creek | | | 500 |
| Minneapolis, Little Horse Creek | | | 1,600 |
| Montezuma, Deep Gap Branch | | | 2,400 |
| Emmonds Creek | | | 2,400 |
| Kawana Lake | | | 4,000 |
| Linville River | | | 4,800 |
| Stepup Branch | | | 1,600 |
| West Fork Creek | | | 3,200 |
| Penland, Brush Creek | | | 1,000 |
| Penrose, Brier Creek | | | 2,400 |
| Crab Creek | | | 3,200 |
| Grassy Creek | | | 2,400 |
| Laurel Creek | | | 2,400 |
| Little River | | | 3,200 |
| Reasonover Creek | | | 2,400 |
| Shoal Creek | | | 2,400 |
| Staghorn Creek | | | 2,400 |
| Raeford, Pasture Branch | | | 1,600 |
| Toecane, Cane Creek | | | 500 |
| Club Creek | | | 500 |
| Hine Creek | | | 500 |
| Tomotla, Colvards Creek | | | 3,200 |
| Hayes Mill Creek | | | 3,200 |
| Waynesville, Balsam Spring Branch | | | 1,600 |
| Bennett Branch | | | 1,600 |
| Brindle Creek | | | 1,600 |
| Caldwell Fork Creek | | | 1,600 |
| Catatuchee Creek | | | 3,200 |
| Francis Branch | | | 3,200 |
| Hemlock Pond | | | 3,200 |
| Hyatts Branch | | | 1,600 |
| Indian Creek | | | 1,600 |
| Jaynes Branch | | | 1,600 |
| Jonathan Creek | | | 3,200 |
| Locust Grove Run | | | 1,600 |
| Long Branch | | | 1,600 |
| Loves Branch | | | 1,600 |
| Nick Creek | | | 1,600 |
| Pigeon River, Grassy Fork | | | 1,600 |
| Pigeon River, Middle Fork | | | 1,600 |
| Shelton Cove Creek | | | 1,600 |
| Ugly Creek | | | 1,600 |
| Whittier, Conley Creek | | | 1,600 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Ohio: | | | |
| Bellefontaine, Macochee Creek | | | 4,000 |
| Spring Branch | | | 3,000 |
| Cleveland, Canyon Spring | | | 2,000 |
| Mansfield, Golf Spring Run | | | 3,000 |
| Mercer Creek | | | 4,000 |
| Mercer Lake | | | 2,000 |
| Niles Run | | | 3,000 |
| Reynolds Run | | | 3,000 |
| Ravena, Spring Creek | | | 3,000 |
| Urbana, Powells Brook | | | 3,000 |
| Oklahoma: | | | |
| Carrier, Spring Bark Creek | | | 600 |
| Weatherford, Deer Creek | | | 400 |
| Oregon: | | | |
| Baker City, Daly Creek | | 5,000 | |
| Duncan, Meacham Creek | | 4,000 | |
| Gibbon, Umatilla River | | 4,000 | |
| Hilgard, Spring Creek | | 3,000 | |
| Milwaukee, Crystal Lake | | 15,000 | |
| Oregon City, Abernethy River | | 10,000 | |
| Clear Creek | | 5,000 | |
| Rock Creek Pond | | 9,000 | |
| Woodcock River | | 9,800 | |
| Pennsylvania: | | | |
| Allentown, Cedar Creek | | | 3,000 |
| Altoona, Big Laurel Run | | | 500 |
| Burgoon Run | | | 500 |
| Chondrius Run | | | 500 |
| Dennmaree Run | | | 500 |
| Figarts Run | | | 500 |
| Green Springs Run | | | 500 |
| Juniata Gap Run | | | 500 |
| Laurel Run | | | 500 |
| Mill Run | | | 500 |
| Neb Run | | | 500 |
| Sandy Run | | | 500 |
| Arcadia, Powell's pond | | | 500 |
| Auburn, Bear Creek | | | 1,200 |
| Gold Mine Creek | | | 1,000 |
| Stony Creek | | | 2,500 |
| Austin, Bailey Run | | | 1,000 |
| Bark Shanty Run | | | 500 |
| Big Moores Run | | | 1,000 |
| Birch Run | | | 1,000 |
| Berg Run | | | 1,000 |
| Cowley Run | | | 1,000 |
| Darwin Run | | | 1,000 |
| East Fork Creek | | | 1,000 |
| Freeman Run | | | 1,000 |
| Hammersley Run | | | 1,000 |
| Jones Run | | | 1,000 |
| Little Nelson Run | | | 1,000 |
| Nelson Run | | | 1,000 |
| Portage Creek | | | 1,000 |
| Prouty Run | | | 1,000 |
| South Fork Run | | | 1,000 |
| South Woods Creek | | | 1,000 |
| Wild Boy Run | | | 1,000 |
| Bellefonte, Fulmers Run | | | 1,500 |
| Spring Run | | | 3,000 |
| Belleville, Kishacoquillas Creek | | | 1,500 |
| Kishacoquillas Creek, South Fork | | | 2,000 |
| Bellwood, Logan Spring Pond | | | 500 |
| Benton, Banks Run | | | 1,000 |
| Belles Run | | | 1,500 |
| Benjamin Run | | | 500 |
| Colley Brook | | | 500 |
| Fair Brook | | | 500 |
| Fishing Creek | | | 1,000 |
| Gallas Run | | | 500 |
| Hess Run | | | 1,000 |
| Hickory River | | | 1,000 |
| McHenry Run | | | 500 |
| Raven Creek | | | 2,000 |
| Wiles Run | | | 1,000 |
| Wynona Brook | | | 500 |
| Berlin, Laurel Run | | | 2,000 |
| Birdsboro, Molasses Pond | | | 300 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Bloomsburg, Crouse Run | | | 500 |
| Brandonville, Torbert Run | | | 600 |
| Davis Run | | | 1,200 |
| Bridgeton, Wises Run | | | 500 |
| Bushkill, Bushkill Creek | | | 2,000 |
| Carrolltown Road, Ahles Run | | | 500 |
| Bash Run | | | 500 |
| Bearer Run | | | 500 |
| Boslet Run | | | 500 |
| Davis Run | | | 500 |
| Edwards Run | | | 500 |
| Farabaugh Run | | | 500 |
| Flemings Run | | | 500 |
| Flick Run | | | 500 |
| Griffith Run | | | 500 |
| Kane Run | | | 500 |
| Kirk Run | | | 500 |
| Lauer Run | | | 500 |
| Meisels Run | | | 500 |
| Mohler Run | | | 500 |
| Owens Run | | | 500 |
| Reese Run | | | 500 |
| Shettig Run | | | 500 |
| Snyder Run | | | 500 |
| Springer Run | | | 500 |
| Thomas Run | | | 500 |
| Tudor Run | | | 500 |
| Williams Run | | | 500 |
| Centerbridge, Rodgers's pond | | | 500 |
| Central, Beaver Run | | | 500 |
| Davis Brook | | | 500 |
| Jones Brook | | | 500 |
| Stony Brook | | | 500 |
| Chambersburg, Birch Run | | | 4,000 |
| Carbaugh Run | | | 2,500 |
| Hoosic Run | | | 2,500 |
| Cherry Run, Penns Run | | | 375 |
| Cherry Tree, Shryock Run, North Branch | | | 500 |
| Clarendon, Elk Run | | | 1,000 |
| Six Mile Creek | | | 1,000 |
| Wild Cat Creek | | | 1,500 |
| Clearfield, Cold Run | | | 1,000 |
| Lick Run | | | 1,000 |
| Moose Creek | | | 1,000 |
| Morgan Run | | | 1,000 |
| Stone Run | | | 1,000 |
| Trout Run | | | 1,000 |
| Coburn, Donners Deich Run | | | 500 |
| East Elk Creek | | | 1,000 |
| Elk Creek | | | 1,000 |
| Philips Creek | | | 1,000 |
| Rough Run | | | 500 |
| Spring Run | | | 500 |
| Turpentine Creek | | | 1,000 |
| West Elk Creek | | | 1,000 |
| Cold Springs, Pine Swamp Run | | | 1,200 |
| Coles Creek, Black Ash Run | | | 500 |
| Coudersport, Allegheny River | | | 1,000 |
| Big Moreo Run | | | 1,000 |
| Lyman Run | | | 1,000 |
| Mill Creek | | | 1,000 |
| Pine Creek | | | 1,000 |
| Prouty Creek | | | 1,000 |
| Sinnamahoning Creek, South Branch | | | 1,000 |
| Crandalltown, Long Run | | | 1,200 |
| Cresco, Broadhead Creek | | | 2,000 |
| Buck Hill Creek | | | 1,500 |
| Honnet Hill Creek | | | 1,000 |
| Mill Creek | | | 1,000 |
| Rattlesnake Creek | | | 1,000 |
| Stony Run | | | 1,500 |
| Cresson, Clearfield Creek | | | 1,000 |
| Three Spring Run | | | 500 |
| Winterset Run | | | 500 |
| Daylesford, Darby Creek | | | 500 |
| Delta, Knell Run | | | 1,000 |
| Mine Run | | | 1,000 |
| Samples Run | | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Downingtown, Dallin Run | | | 2,000 |
| Davis Run | | | 2,000 |
| Glen Isle Run | | | 500 |
| Rock Run | | | 2,000 |
| Dubois, Big Anderson Creek | | | 2,000 |
| Ebensburg, Abrams Run | | | 500 |
| Bash Run | | | 500 |
| Blacklick Creek | | | 500 |
| California Run | | | 500 |
| Clear Spring Run | | | 500 |
| David Evans Pond | | | 500 |
| Davis Creek | | | 500 |
| Factory Run | | | 500 |
| Farren Brook | | | 500 |
| James Run | | | 500 |
| Jones Creek | | | 1,000 |
| Kirschner Run | | | 500 |
| Laurel Branch | | | 500 |
| Lloyds Run | | | 500 |
| Noel Run | | | 500 |
| Roberts Run | | | 500 |
| St. James Run | | | 500 |
| Sakarak Run | | | 500 |
| Smith Run | | | 500 |
| Stewarts Run | | | 500 |
| Tudor Run | | | 500 |
| Williams Run | | | 1,000 |
| Ellenton, Rock Run | | | 2,000 |
| Emporium, Cooks Run | | | 1,000 |
| Crooked Run | | | 500 |
| East Cowley Creek | | | 1,000 |
| North Creek | | | 1,000 |
| Parker Creek | | | 1,000 |
| Salt Run | | | 2,000 |
| Sinnamahoning Creek | | | 1,000 |
| West Cowley Creek | | | 1,000 |
| Farrandsville, Lick Run | | | 2,800 |
| Fern Glen, Big Tomhicken Creek | | | 600 |
| Crooked Run | | | 1,000 |
| Roberts Run | | | 1,000 |
| Sand Spring Run | | | 1,000 |
| Fishing Creek, Fishing Creek | | | 1,500 |
| Martin Run | | | 500 |
| Forks, Huntingdon Creek | | | 2,500 |
| Little Pine Creek | | | 1,000 |
| Fort Washington, Kennedy's pond | | | 400 |
| Frackville, Crystal Creek | | | 600 |
| Little Mahanoy Creek | | | 1,800 |
| Tower Run | | | 1,000 |
| Frazer, Pigeon Run Pond | | | 500 |
| Glen Iron, Penns Run | | | 1,125 |
| Grays Run, Grays Run | | | 1,800 |
| Long Run | | | 1,800 |
| Yoder Run | | | 1,000 |
| Yoxtheimer Run | | | 600 |
| Greencastle, Willow Brook | | | 1,000 |
| Hawley, Wallen Paupac River | | | 1,500 |
| Hellam, Locust Run | | | 1,000 |
| High Rock, Livingston Run | | | 500 |
| Lockport Run | | | 500 |
| Tom Creek | | | 1,000 |
| Hollidaysburg, Blairs Creek | | | 1,000 |
| Honesdale, Baker Brook | | | 500 |
| Bates Creek | | | 500 |
| Big Creek | | | 1,000 |
| Bramms Pond | | | 500 |
| Calkins Creek | | | 500 |
| Dyberry Creek | | | 1,000 |
| Fivemile Creek | | | 500 |
| Gageis Brook | | | 500 |
| Haines Brook | | | 500 |
| Kreglers Creek | | | 500 |
| Lackawaxen River | | | 1,000 |
| Lackawaxen River, North Branch | | | 1,000 |
| Middle Creek | | | 1,000 |
| Mitchell Creek | | | 500 |
| Old Log Cabin Creek | | | 1,000 |
| Paynter Brook | | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Honesdale, Rattlesnake Creek | | | 1,000 |
| Rout Creek | | | 500 |
| West Branch | | | 1,000 |
| Hopewell, Beaver Creek | | | 2,000 |
| Otts Run | | | 500 |
| Three Spring Run | | | 500 |
| Yellow Creek | | | 1,000 |
| Howard, Lick Run | | | 500 |
| Hughesville, Muncy Creek | | | 3,000 |
| Huntingdon, Mill Creek | | | 1,000 |
| Stone Creek | | | 1,500 |
| Trough Creek | | | 1,500 |
| Jamison City, Bloody Run | | | 1,000 |
| Grassy Hollow Run | | | 1,000 |
| Haugh Run | | | 500 |
| Jersey Shore, Larrys Creek | | | 2,400 |
| Keating Summit, Brown Hollow Creek | | | 500 |
| Cowley Run | | | 1,000 |
| Indian Run | | | 500 |
| Portage Creek | | | 1,000 |
| Spring Creek | | | 500 |
| Knoxville, Troups Creek | | | 1,500 |
| Lancaster, Furnace Run | | | 1,000 |
| Middle Creek | | | 1,000 |
| Silver Run | | | 1,000 |
| Steinmans Run | | | 1,000 |
| Walnut Run | | | 1,000 |
| Landerberg, White Clay Creek, West Branch | | | 500 |
| Lanesboro, Brushville Creek | | | 500 |
| Canawacta Creek | | | 1,000 |
| Cascade Creek | | | 1,000 |
| Cold Spring Brook | | | 1,000 |
| Dodges Creek | | | 500 |
| Drinker Creek | | | 1,000 |
| Egypt Creek | | | 1,500 |
| Hemlock Creek | | | 2,000 |
| Roaring Brook | | | 500 |
| Wild Cat Brook | | | 1,000 |
| Laquin, Little Schrader Creek | | | 1,800 |
| Laubach Station, Hess Run | | | 500 |
| Longs Brook | | | 500 |
| Savage Brook | | | 500 |
| Laughlintown, McMullen Run | | | 1,000 |
| Lebanon, Tulpehocken Creek | | | 1,000 |
| Lehighton, Spring Brook | | | 600 |
| Lemont, Cedar Creek | | | 500 |
| Furnace Run | | | 500 |
| Hublers Gap Run | | | 500 |
| Laurel Run | | | 1,000 |
| Pine Swamp Run | | | 500 |
| Spring Creek | | | 1,500 |
| Lenover, Weavers Run | | | 500 |
| Lewisburg, Laurel Run | | | 1,500 |
| Rapid Run | | | 1,500 |
| White Deer Creek | | | 1,500 |
| Lilly, Bear Rock Creek | | | 500 |
| Dunn Creek | | | 500 |
| Hughes Spring Pond | | | 500 |
| Laurel Run | | | 500 |
| McTamany Run | | | 1,000 |
| Lock Haven, Bagley Run | | | 500 |
| Birds Run | | | 1,200 |
| Brewer Run | | | 500 |
| Castenea Run | | | 1,200 |
| Cherry Run | | | 500 |
| Chriss Faust Run | | | 1,400 |
| Clarks Run | | | 500 |
| Considines Run | | | 700 |
| Craig Run | | | 500 |
| Deise Run | | | 1,200 |
| Eady Run | | | 500 |
| Earon Run | | | 500 |
| Eckers Run | | | 500 |
| Ferney Run | | | 500 |
| Fogarty Run | | | 700 |
| Goulds Run | | | 500 |
| Grows Run | | | 500 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Lock Haven, Halls Run | | | 1,400 |
| Hanna Run | | | 500 |
| Harlens Run | | | 1,400 |
| Harveys Run | | | 1,200 |
| Heaveners Run | | | 700 |
| Hurds Run | | | 500 |
| Jerry Run | | | 500 |
| Johnson Run | | | 500 |
| Kamp Run | | | 1,200 |
| Kirbys Run | | | 1,200 |
| Kissell Run | | | 1,800 |
| Little Bagley Run | | | 500 |
| Little Plum Run | | | 500 |
| Little Sugar Valley Run | | | 1,200 |
| Lloyds Run | | | 700 |
| Lucas Run | | | 1,200 |
| Lusk Run | | | 500 |
| McCloskey Run | | | 500 |
| McElhattan Creek | | | 2,400 |
| McKagnes Run | | | 1,200 |
| Martins Run | | | 1,200 |
| Mill Run | | | 500 |
| Mitchell Run | | | 500 |
| Moganhans Run | | | 1,200 |
| Muncher Run | | | 700 |
| Musters Run | | | 1,200 |
| North Fork Run | | | 500 |
| Packer Run | | | 500 |
| Pine Bottom Run | | | 1,200 |
| Plum Run | | | 500 |
| Queens Run | | | 500 |
| Quiggles Run | | | 1,200 |
| Ram Hollow Run | | | 500 |
| Reed Run | | | 500 |
| Rickers Run | | | 1,400 |
| Rock Run | | | 700 |
| Shadles Run | | | 1,400 |
| Shingle Hollow Run | | | 500 |
| Slab Run | | | 500 |
| South Fork Run | | | 500 |
| Spring Run | | | 700 |
| Sugar Run | | | 500 |
| Totanhorn Run | | | 1,400 |
| Tyler Run | | | 500 |
| Welsh Run | | | 500 |
| Wetzells Run | | | 700 |
| Widmans Run | | | 500 |
| Wiener Run | | | 1,200 |
| Wild Run | | | 500 |
| Winber Run | | | 500 |
| McElhattan, Bixler Run | | | 700 |
| Chathams Run | | | 2,100 |
| Comerdner Run | | | 1,200 |
| Jemersons Run | | | 700 |
| Little Chathams Run | | | 1,200 |
| Lucas Run | | | 1,200 |
| McElhattan Run | | | 700 |
| Motter Run | | | 1,200 |
| Nolans Run | | | 700 |
| Russells Run | | | 700 |
| Spring Run | | | 700 |
| Mahanoy City, Stony Run | | | 600 |
| Mansfield, Griffin Creek | | | 3,000 |
| Marienville, Bear Pen Run | | | 500 |
| Big Salmon Creek | | | 1,500 |
| Blue Jay Creek | | | 1,000 |
| Brush Creek | | | 500 |
| Centennial Run | | | 500 |
| Cherry Creek | | | 500 |
| Coleman Run | | | 1,000 |
| Crosman's pond | | | 500 |
| East Cherry Creek | | | 500 |
| East Millstone Creek | | | 1,000 |
| Guston Run | | | 500 |
| Hall's pond | | | 500 |
| Huling Run | | | 500 |
| Jakes Run | | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Marienville, Maple Creek | | | 1,000 |
| North Salmon Creek | | | 1,000 |
| Six Mile Run | | | 500 |
| Truby Run | | | 500 |
| Warner Run | | | 500 |
| West Millstone Creek | | | 2,000 |
| Wild Cat Run | | | 500 |
| Marklesburg, Touse Run | | | 500 |
| Marsh Hill, Frozen Run | | | 1,500 |
| Maston, Pigeon Run | | | 1,000 |
| Pleasant Stream | | | 2,000 |
| Smith Run | | | 1,000 |
| Mauch Chunk, Bear Creek | | | 600 |
| Big Bear Creek | | | 1,000 |
| Drakes Creek | | | 1,000 |
| Glen Run | | | 600 |
| Heydst Run | | | 600 |
| Hickory Run | | | 1,000 |
| James Run | | | 1,000 |
| Keipers Run | | | 600 |
| Mauch Chunk Creek | | | 1,000 |
| Mud Run | | | 1,500 |
| Panther Creek | | | 600 |
| Pine Run | | | 1,000 |
| Robinsons Run | | | 600 |
| Ruddles Run | | | 600 |
| Sand Spring Run | | | 500 |
| Stony Creek | | | 1,000 |
| Wild Creek | | | 1,000 |
| Yellow Run | | | 1,000 |
| Mayport, Pine Run | | | 2,000 |
| Meadville, Berley Run | | | 1,000 |
| Brawley Run | | | 500 |
| Hamilton Run | | | 1,000 |
| Little Sugar Creek | | | 1,000 |
| Spring Run | | | 1,000 |
| Middleport, Cold Run | | | 1,000 |
| Mifflinburg, Brush Hollow Run | | | 500 |
| Buffalo Creek | | | 1,500 |
| First Gap Run | | | 500 |
| Fourth Gap Run | | | 1,500 |
| Halfway Gap Run | | | 500 |
| Hays Gap Run | | | 500 |
| Lukers Gap Run | | | 500 |
| Pine Swamp Creek | | | 1,000 |
| Rapid Run | | | 1,500 |
| Reeds Gap Run | | | 500 |
| Sand Run | | | 500 |
| Second Gap Run | | | 500 |
| Spruce Run | | | 1,000 |
| Third Gap Run | | | 1,000 |
| Yankee Run | | | 500 |
| Mifflintown, Big Run | | | 1,500 |
| East Lost Creek | | | 1,500 |
| Hornings Run | | | 1,000 |
| Sponhowers Run | | | 1,000 |
| Tennis Run | | | 500 |
| West Lost Creek | | | 1,500 |
| Millville, Bear Run | | | 1,000 |
| Milroy, Laurel Run | | | 1,500 |
| New Lancaster Stream | | | 1,500 |
| Mt. Joy, Big Spring Creek | | | 500 |
| Mt. Pocono, Wilson Spring Run | | | 500 |
| Mt. Union, Carters Run | | | 500 |
| Scrub Gap Run | | | 1,000 |
| Singers Gap Run | | | 1,000 |
| Muncy, Muncy Creek | | | 2,500 |
| New Freedom, Codorus Creek | | | 1,000 |
| Summitt Creek | | | 500 |
| New Holland, Goods Run | | | 500 |
| New Ringgold, Beaver Creek | | | 600 |
| Cold Run | | | 600 |
| Rausch Creek | | | 1,000 |
| Newton Hamilton, Licking Creek | | | 1,000 |
| Long Hollow Run | | | 500 |
| Nigger Creek | | | 1,000 |
| Orangeville, Achenbach Run | | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Osceola Mills, Bear Run | | | 2,000 |
| California Run | | | 2,000 |
| Coal Creek | | | 2,000 |
| Flat Rock Creek | | | 2,000 |
| Mountain Creek | | | 2,000 |
| Trout Run | | | 2,000 |
| Paddy Mountain, Penns Run | | | 2,625 |
| Palm, Indian Creek | | | 1,000 |
| Parkersburg, Octorara Creek | | | 1,500 |
| Parsons, Bear Creek | | | 1,500 |
| Meadow Run | | | 1,000 |
| Pond Creek | | | 1,000 |
| Ten Mile Run | | | 1,000 |
| Patton, Carroll Creek | | | 500 |
| Shehan Run | | | 500 |
| Paxinos, Irish Creek | | | 1,000 |
| Petersburg, Garners Run | | | 1,000 |
| Globe Run | | | 1,000 |
| Irvins Run | | | 500 |
| Lick Run | | | 1,000 |
| Roaring Run | | | 500 |
| Philadelphia, Darbey Creek | | | 1,000 |
| Philipsburg, Ardells Spring Run | | | 500 |
| Barker Run | | | 500 |
| Beaver Run | | | 1,500 |
| Bennens Run | | | 1,000 |
| Big Spring Run | | | 500 |
| Bilgers Run | | | 1,000 |
| Black Bear Run | | | 1,500 |
| Black Moshannon Creek | | | 2,000 |
| California Run | | | 1,000 |
| Clearwater Run | | | 1,000 |
| Clover Run | | | 1,000 |
| Cold Run | | | 2,000 |
| Dayton Run | | | 1,000 |
| Echo Glen Park Lakes | | | 1,000 |
| McCords Run | | | 500 |
| Morgan Run | | | 1,000 |
| Nooch Run | | | 1,000 |
| One Mile Run | | | 500 |
| Senser Run | | | 500 |
| Seven Springs Run | | | 500 |
| Shields Run | | | 500 |
| Six Mile Run | | | 2,000 |
| Smays Run | | | 1,000 |
| Tests Run | | | 500 |
| Tomtit Run | | | 500 |
| Upper Daugherty Run | | | 600 |
| Whetstone Run | | | 500 |
| Wolf Run | | | 1,000 |
| Pleasant Stream Junction, Potash Run | | | 1,200 |
| Pottstown, Powderdale Run | | | 1,200 |
| Pottsville, Big Creek | | | 1,200 |
| Black Creek | | | 1,500 |
| Breechlez Pond | | | 600 |
| Eichert Creek | | | 600 |
| Hells Creek | | | 600 |
| Neland's pond | | | 600 |
| Rattling Run | | | 600 |
| Seltzer Creek | | | 600 |
| Stony Creek | | | 600 |
| Strouser Creek | | | 600 |
| Powys, Cold Fork Run | | | 500 |
| Daugherty Run | | | 600 |
| Long Fork Run | | | 600 |
| Lower Daugherty Run | | | 600 |
| Wolf Run | | | 600 |
| Ralston, Rocky Run | | | 2,000 |
| Rattling Run, Rattling Run | | | 500 |
| Reading, Furnace Creek | | | 600 |
| Hartmens Creek | | | 500 |
| Hay Creek | | | 1,000 |
| Holdennan Creek | | | 500 |
| Laurel Creek | | | 3,500 |
| Limekiln Brook | | | 600 |
| Willow Creek | | | 600 |
| Wyomissing Creek | | | 600 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Reedsville, Kishacoquillas Creek | | | 2,000 |
| Renovo, Bakers Run | | | 2,400 |
| Barneys Run | | | 1,200 |
| Benjamin Run | | | 1,200 |
| Boggs Run | | | 1,200 |
| Cranberry Run | | | 1,200 |
| Drurys Run | | | 3,600 |
| Fish Dam Run | | | 1,400 |
| Halls Run | | | 1,800 |
| Paddys Run | | | 2,100 |
| Shintown Run | | | 1,400 |
| Reynoldsville, Bear Pen Run | | | 1,000 |
| Black Run | | | 1,000 |
| Bollingers Run | | | 1,000 |
| Boyer Run | | | 1,000 |
| Britton Run | | | 1,000 |
| Bustop Run | | | 1,000 |
| Callen Run | | | 1,000 |
| Camp Run | | | 1,500 |
| Clover Run | | | 1,000 |
| Deans Run | | | 1,000 |
| Deemers Run | | | 500 |
| Degnan Run | | | 1,000 |
| Five Mile Run | | | 1,000 |
| Forest Run | | | 1,000 |
| Horn Run | | | 1,000 |
| Jenkins Run | | | 1,000 |
| Keys Run | | | 500 |
| Kyle Run | | | 1,000 |
| Laurel Run | | | 1,000 |
| McConnells Run | | | 1,000 |
| Manners Run | | | 1,000 |
| Mill Creek | | | 1,000 |
| Mitchells Run | | | 1,000 |
| Morrison Run | | | 1,000 |
| Mountain Run | | | 1,000 |
| Mowrey Run | | | 1,000 |
| O'Donnell Run | | | 1,000 |
| Panther Run | | | 1,000 |
| Pitch Pine Run | | | 1,000 |
| Rattlesnake Run | | | 1,000 |
| Schuckers Run | | | 1,000 |
| South Fork Creek | | | 1,000 |
| Stevenson Run | | | 1,000 |
| Toby Run | | | 1,000 |
| Trout Run | | | 1,000 |
| West Fork Creek | | | 1,000 |
| Whitstone Run | | | 1,500 |
| Windfall Run | | | 1,000 |
| Wolf Creek | | | 1,000 |
| Rising Springs, Laurel Run | | | 2,000 |
| Locust Run | | | 1,000 |
| Penns Creek | | | 2,500 |
| Rockport, Rapps Creek | | | 1,000 |
| Roulette, Bear Hollow Creek | | | 1,000 |
| Card Creek | | | 500 |
| Fishing Creek | | | 2,000 |
| Fish Hollow Creek | | | 1,000 |
| Laninger Creek | | | 500 |
| Reeds Run | | | 1,500 |
| Sartwell Creek | | | 1,000 |
| Trout Brook | | | 1,000 |
| Royer, McAllister Pond | | | 500 |
| Piney Creek | | | 1,000 |
| Sandy Run | | | 500 |
| Spring Run | | | 1,000 |
| Shade Gap, Scouts Run | | | 500 |
| Shenandoah, Fowler Pond | | | 1,000 |
| Knicker Hollow Run | | | 1,000 |
| Railroad Reservoir | | | 1,000 |
| Rattling Run | | | 600 |
| Shenandoah Reservoir | | | 500 |
| Thrashers Run | | | 600 |
| Trexler Run | | | 1,000 |
| Short Run Station, Short Run | | | 1,000 |
| Shrewsbury, Deer Creek | | | 500 |
| Smethport, Boyer Brook | | | 1,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Somerfield, Youghiogheny River | | | 400 |
| Spruce Creek, Spruce Creek | | | 2,000 |
| Starrucca, Coxtown Creek | | | 1,000 |
| Farrell Creek | | | 500 |
| McKane Creek | | | 1,000 |
| Sampson Creek | | | 500 |
| Shadagee Creek | | | 1,000 |
| Shehawkin Creek | | | 500 |
| Starrucca Creek | | | 2,000 |
| Wild Cat Creek | | | 500 |
| Stewartstown, Grove Run | | | 1,000 |
| Stillwater, Myers Run | | | 500 |
| Roberts Run | | | 500 |
| Trout Run | | | 500 |
| Stroudsburg, Baker Run | | | 500 |
| Broadhead Creek | | | 1,500 |
| Brown Run | | | 1,000 |
| Cherry Creek | | | 2,000 |
| Deep Hollow Run | | | 1,000 |
| Kettle Run | | | 1,000 |
| McMichaels Creek | | | 1,500 |
| Mountain Creek | | | 1,000 |
| Pencil Creek | | | 2,000 |
| Pocono Creek | | | 2,000 |
| Sambo Creek | | | 600 |
| Wigwam Run | | | 500 |
| Tionesta, Bates Run | | | 500 |
| Bear Creek | | | 500 |
| Big Coon Creek | | | 1,500 |
| Chauncy Run | | | 500 |
| Council Run | | | 500 |
| Davis Run | | | 500 |
| Dawson Run | | | 500 |
| Hemlock Creek | | | 1,500 |
| Holeman Run | | | 500 |
| Indian Camp Creek | | | 500 |
| Jakes Run | | | 500 |
| Jamieson Run | | | 500 |
| Johns Run | | | 500 |
| Jug Handle Run | | | 500 |
| Korb Run | | | 500 |
| Lamentation Run | | | 500 |
| Little Coon Creek | | | 1,000 |
| Little Hickory Creek | | | 1,000 |
| Little Tionesta Creek | | | 1,000 |
| Pearson Run | | | 500 |
| Peters Run | | | 500 |
| Pigeon Run | | | 500 |
| Piney Run | | | 500 |
| Pit Hole Creek | | | 1,500 |
| Reck Run | | | 500 |
| Ross Run | | | 1,000 |
| Salmon Creek | | | 1,500 |
| Sandrock Run | | | 500 |
| Sibble Run | | | 500 |
| Stewarts Run | | | 1,000 |
| Sugar Run | | | 500 |
| Tubbs Run | | | 1,000 |
| Tower City, Clarks Creek | | | 2,500 |
| Rausch Creek | | | 1,000 |
| Troy, Becker Creek | | | 600 |
| Bullard Creek | | | 600 |
| Cleveland Creek | | | 600 |
| Covert Creek | | | 600 |
| Dry Run | | | 600 |
| Forbes Creek | | | 600 |
| Keith Creek | | | 600 |
| Kieff Creek | | | 1,000 |
| Kinar Creek | | | 600 |
| Morgan Creek | | | 1,000 |
| Palmer Creek | | | 600 |
| Rathborn Creek | | | 1,200 |
| Sherman Creek | | | 600 |
| Tamarack Creek | | | 600 |
| Webber Creek | | | 500 |
| Ulysses, Pine Creek | | | 1,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Pennsylvania—Continued. | | | |
| Waynesboro, Antietam Spring, Branch | | | 500 |
| Weikert, Penns Run | | | 375 |
| West Chester, Broad Run | | | 500 |
| Wheelersville, Schrader Creek | | | 3,000 |
| Williamsburg, Brumbaughs Run | | | 500 |
| Clover Creek | | | 2,000 |
| Marsh Run | | | 500 |
| Woodbine, Bells Hollow Branch | | | 1,000 |
| Boyds Run | | | 1,000 |
| Kilgore Run | | | 500 |
| Rocky Run | | | 1,000 |
| Wade Hill Branch | | | 500 |
| York, Green Branch | | | 1,000 |
| South Carolina: | | | |
| Cleveland, Fall Creek | | | 3,200 |
| Headforemost Creek | | | 3,200 |
| Reeces Gap Creek | | | 2,400 |
| Pickens, Big Laurel Creek | | | 1,600 |
| Cane Creek | | | 2,400 |
| Dogwood Stump Creek | | | 3,200 |
| Laurel Ford Creek | | | 2,400 |
| Laurel Fork Creek | | | 2,400 |
| Lynchs Mill Creek | | | 2,400 |
| Mathers Creek | | | 2,400 |
| Sicle Mountain Creek | | | 2,400 |
| Surveyors Camp Creek | | | 2,400 |
| Willis Creek | | | 2,400 |
| South Dakota: | | | |
| Custer, Willow Creek | | | 7,500 |
| Deadwood, Spruce Creek | | | 8,000 |
| Doyle, Big Elk Creek | | | 20,000 |
| Dumont, Spearfish Creek, East Fork | | | 5,000 |
| Elmore, Ice Box Canyon Creek | | | 10,000 |
| Spearfish Creek | | | 15,000 |
| Englewood, White Wood Creek | | | 10,000 |
| Hanna, Little Spearfish Creek, East Fork | | | 10,000 |
| Hermosa, Battle Creek | | | 12,500 |
| Hill City, Dismal Creek | | | 7,500 |
| Gibson Creek | | | 10,000 |
| Hutton Creek, South Branch | | | 10,000 |
| Palmer Creek | | | 10,000 |
| Spring Creek | | | 7,500 |
| Sunday Gulch Creek | | | 7,500 |
| Mystic, Prairie Creek | | | 20,000 |
| Tittles Springs Pond | | | 20,000 |
| Victoria Creek | | | 20,000 |
| Nemo, Box Elder Creek | | | 12,000 |
| Jim Creek | | | 6,000 |
| Knowlton's pond | | | 6,000 |
| South Box Elder Creek | | | 6,000 |
| Pine Ridge Agency, Bear Creek | | | 12,500 |
| Pringle, Beaver Creek | | | 8,000 |
| Cold Brook | | | 8,000 |
| Rapid City, Deer Creek | | | 20,000 |
| Pine Forest Lake | | | 12,500 |
| Rapid Creek | | | 20,000 |
| Spring Canyon Pond | | | 30,000 |
| Roubaix, Carroll Creek | | | 6,000 |
| Halls Pond | | | 6,000 |
| North Elk Creek | | | 6,000 |
| Rochford, Little Rapid Creek, North Fork | | | 10,000 |
| Sisseton, Long Hollow Creek | | | 1,000 |
| Spearfish, Cox Lake | | | 2,500 |
| False Bottom Creek | | | 2,500 |
| Hiltons Gulch Creek | | | 8,000 |
| Kingsley's lake | | | 12,000 |
| Lindley Spring Run | | | 14,000 |
| McGregor Spring Branch | | | 10,000 |
| Miller Creek | | | 10,000 |
| Normal Lake | | | 12,000 |
| Spearfish River | | | 75,000 |
| Todd's pond | | | 6,000 |
| Spring Gulch, McDonald Pond | | | 12,500 |
| Sturgis, Deadmans Creek | | | 10,000 |
| Walker, Rock Creek Pond | | | 12,500 |
| Tennessee: | | | |
| Blevins, Brushy Creek | | | 2,400 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Tennessee—Continued. | | | |
| Butler, Greggs Branch | | | 2,400 |
| Greenville, Camp Creek | | | 4,000 |
| Knoxville, Fountain City Lake | | | 4,000 |
| Nashville, Lipscomb's pond | | | 800 |
| Newport, Ground Hog Creek | | | 2,400 |
| Pikeville, Bradens Creek | | | 4,000 |
| Cooper Branch | | | 2,400 |
| Glade Creek | | | 5,600 |
| Halls Creek | | | 3,200 |
| Skillern Creek | | | 4,000 |
| Shell City, Doll Branch | | | 1,600 |
| Shell Creek | | | 5,600 |
| Slocums, Farmer Branch | | | 1,600 |
| Shouns, McEwen Branch | | | 1,600 |
| Payne creek | | | 1,600 |
| Utah: | | | |
| Provo, applicant | 100,000 | | |
| Applicant | 25,000 | | |
| Grandview Pond | | | 1,800 |
| Provo River | | 18,600 | |
| Robins Springs Pond | | | 1,800 |
| Spring Creek Pond | | | 1,800 |
| Springdale Pond | | | 3,600 |
| Upper Falls Ponds | | | 1,800 |
| Vineyard Ponds | | | 3,600 |
| Salt Lake, Spring Creek | | | 3,000 |
| Springville, Spring Creek | | | 2,400 |
| Vermont: | | | |
| Averill, Forest Lake | | 35,000 | |
| Little Averill Lake | | 55,000 | |
| Mild Brook | | | 1,500 |
| Bellows Falls, Morse Brook | | 25,000 | |
| Bennington, Jackson Brook | | 12,000 | |
| Brattleboro, Ames Brook | | | 1,000 |
| Brickyard Brook | | | 1,000 |
| Broad Brook | | | 1,500 |
| Houghton Brook | | | 1,000 |
| Johnson Brook | | | 1,000 |
| Weatherhead Hollow Brook | | | 1,000 |
| Whetstone Brook | | | 2,000 |
| Wilder Brook | | | 1,000 |
| Castleton, Castleton River | | | 3,500 |
| Chester, Fullerton Brook | | | 1,000 |
| Williams River | | | 3,000 |
| Cuttingsville, Shrewsbury Pond | | | 4,800 |
| Fair Haven, Eureka Pond | | | 1,000 |
| Fowler, Fowler Brook | | | 1,500 |
| Greensboro, Caspian Lake | | | 6,000 |
| Groton, Darling Pond | | 125,000 | 7,000 |
| Holden, Furnace Brook | | | 10,000 |
| Pico Pond | | | 3,000 |
| Hydeville Castleton River | | | 4,000 |
| Ferrin River | | 6,000 | |
| Lyndonville, Vail's pond | | | 850 |
| Manchester, Batten Kill River | | 56,000 | |
| Lye Brook | | | 1,400 |
| Mountain Brook | | 8,000 | |
| Marshfield, Niggerhead Pond | | | 3,000 |
| Montpelier, Mallory Brook | | | 2,500 |
| North Bennington, Cold Springs Brook | | 12,000 | 1,250 |
| Paran Creek | | 12,000 | 1,250 |
| Northfield, Yatter Pond | | 16,000 | |
| Pawlet, Pawlet River | | | 5,000 |
| Pittsford, Furnace Brook | | 10,000 | |
| Sugar Hollow Brook | | | 3,000 |
| Plainfield, Laird's pond | | | 4,000 |
| Poultney, Poultney River | | | 4,000 |
| Pownel, Mattison Brook | | | 2,000 |
| Proctor, Fox Pond | | | 4,000 |
| Proctorsville, Williams River | | 20,000 | |
| Putney, Sacketts Brook | | | 1,500 |
| Randolph, Ayers Brook | | 20,000 | 2,000 |
| Bear Hill Brook | | 8,000 | |
| Chandler Brook | | 16,000 | |
| Clough Brook | | 8,000 | |
| Eldredge Pond | | | 500 |
| Fisher Brook | | 8,000 | |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Vermont—Continued. | | | |
| Randolph, Guilds Brook | | 8,000 | |
| Halfway Brook | | 16,000 | |
| Howard Hill Brook | | 8,000 | |
| Meadow Brook | | 20,000 | |
| Mud Pond | | 8,000 | |
| Roods Brook | | 8,000 | |
| Roxbury Brook | | 12,000 | |
| Snow Brook | | 8,000 | |
| White River, Middle Branch | | 24,000 | |
| Readsboro, Lamb Brook | | | 1,500 |
| South Branch | | | 1,500 |
| Rutland, Atwood Brook | | | 1,000 |
| Beaver Meadow Brook | | 8,000 | |
| Billings Brook | | | 1,500 |
| Brewer Brook | | 12,000 | |
| Castleton River | | | 5,500 |
| Chittenden Reservoir | | | 12,000 |
| Cold River | | 16,000 | 1,350 |
| Cold River, North Branch | | 12,000 | |
| Cold River, South Branch | | 32,000 | |
| Curtis Brook | | 12,000 | |
| Deermont Creek | | 12,000 | |
| East Brook | | | 1,000 |
| Eddy Brook | | 8,000 | |
| Gleason Brook | | 12,000 | |
| Ira Brook | | 8,000 | |
| Ottaqueechee Brook | | 16,000 | |
| Ripley Brook | | 8,000 | |
| Sharon, Lake Mitchell | | 100,000 | 5,425 |
| White River | | 8,000 | |
| South Royalton, Pinehurst Lake | | 20,000 | |
| South Ryegate, Hatch's pond | | 25,000 | |
| South Wallingford, South Wallingford Branch | | 16,000 | |
| St. Johnsbury, Blodgett Brook | | 15,000 | |
| Fairbanks Ponds | | | 648 |
| Frog Pond | | 10,000 | 500 |
| Green Mountain Brook | | 20,000 | |
| Grouselands Pond | | | 500 |
| Joes Brook | | | 7,500 |
| Lawrence Ponds | | | 500 |
| Meadow Brook | | 20,000 | |
| Sleeper River | | | 1,677 |
| Spaulding Brook | | | 1,000 |
| Stony Brook | | 20,000 | |
| Water Endrick Creek | | | 2,000 |
| Waterman's pond | | | 148 |
| Springfield, Hazen's pond | | | 500 |
| Stockbridge, Tweed River | | 8,000 | 2,000 |
| Taftsville, Beaver Brook | | | 2,000 |
| Townshend, Shanty Lot Brook | | | 2,000 |
| Walden, Haynesville Brook | | | 1,500 |
| Lyford Pond | | 40,000 | |
| Meadow Brook | | 20,000 | |
| Wells, Wells Brook | | 16,000 | |
| West Hartford, Dimmick's ponds | | | 1,000 |
| Meadow Brook | | 8,000 | |
| Northcote Brook | | | 1,000 |
| Rockland Brook | | | 1,000 |
| Whipple Brook | | | 1,000 |
| Woodland Brook | | | 1,000 |
| West Paulet, Indian River | | 20,000 | |
| Windsor, Mill Brook | | | 3,000 |
| Woodstock, Lakota Lake | | | 4,000 |
| Moore Pond | | | 1,569 |
| Smith Brook | | 8,000 | |
| Wyandale Brook | | 8,000 | |
| Virginia: | | | |
| Alleghany Station, Cove Creek | | | 500 |
| Arcadia, North Creek | | | 400 |
| Arrington, Mountain Spring Pond | | | 2,400 |
| Basic City, Baker Springs | | | 300 |
| Jordan Pond | | | 1,000 |
| Bedford, North Otter River | | | 2,400 |
| Big Island, Hunting Creek | | | 4,000 |
| Reed Creek | | | 4,000 |
| Covington, Cast Steel Run | | | 600 |
| Laurel Run | | | 3,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Virginia—Continued. | | | |
| Covington, Roaring Run | | | 3,000 |
| Craigsville, Campbell Run | | | 500 |
| Claytons Brook | | | 1,500 |
| Culpeper, Hazel River | | | 4,800 |
| Miller Creek | | 18,700 | |
| Ferrol, Trout Run | | | 500 |
| Glenvar, Callahan Brook | | | 2,400 |
| Goshen, Kelso Run | | | 6,000 |
| Grottoes, Big Run | | | 300 |
| Harrisonburg, Long Run | | | 300 |
| Hunters, Little Difficult Run | | | 2,500 |
| Jenkins Ford, Cedar Creek | | | 600 |
| Maurertown, Cedar Creek | | | 6,000 |
| Mount Vernon, Washington Spring Branch | | | 1,000 |
| Pearch, Horsleys Creek | | | 2,400 |
| Richmond, Burke's pond | | | 600 |
| Rockfish, Goldmine Creek | | | 2,400 |
| Salem, Peters Creek | | | 6,400 |
| Spout Spring, Steele's pond | | | 500 |
| Stanley, Hendersons Mill Pond | | | 400 |
| Tates Run, Tates Run | | | 50 |
| Tye River, Cox Creek | | | 2,400 |
| Washington: | | | |
| Addy, Stenger Creek | | | 4,500 |
| Bellingham, State Fish Commission | 100,000 | | |
| Colville, Twin Lakes | | | 4,500 |
| Lake View, Clover Creek | | | 5,000 |
| Lamona, Crab Creek | | | 5,500 |
| Newport, Bead Lake | | | 6,000 |
| Mystic Lake | | | 6,000 |
| Seattle, Exposition Aquarium | | | 18 |
| Spangle, Spring Lake | | | 3,000 |
| Spokane, Newman Lake | | | 6,000 |
| Wenatchee, Spring Valley Pond | | | 6,000 |
| West Virginia: | | | |
| Berkeley, Cold Run | | | 800 |
| Beverly, Beaver Creek | | | 1,000 |
| Burner, Harper Run | | | 1,500 |
| Little River | | | 2,000 |
| Mountain Lick Run | | | 2,000 |
| Span Oak Run | | | 2,000 |
| Cairo, Lake Carrell | | | 1,000 |
| Capon Road, Laurel Lake | | | 500 |
| Capon Springs, Mutton Run | | | 3,750 |
| Davis, Blackwater River | | | 2,500 |
| Harman, Spruce Run | | | 1,000 |
| Harton, Candy Creek | | | 3,000 |
| Huttonsville, Elk River | | | 500 |
| Files Creek | | | 1,500 |
| Mill Creek | | | 1,500 |
| Riffles Creek | | | 1,500 |
| Keyser, Patterson Creek, North Fork | | | 1,200 |
| Marlinton, Cochrans Creek | | | 750 |
| Elk River, Crooked Fork | | | 750 |
| Indian Draft Creek | | | 2,500 |
| Mill Run | | | 1,000 |
| May, Greenbrier River | | | 3,000 |
| Orndorf Run | | | 1,000 |
| White Camp Run | | | 1,000 |
| Midvale, Cassity Fork Creek | | | 3,000 |
| Raleigh, Piney Creek | | | 14,000 |
| Renick, Spring Creek | | | 500 |
| Rippon, Bullskin Run | | | 1,500 |
| Seebert, Cranberry Creek | | | 6,000 |
| Terra Alta, Big Run | | | 1,000 |
| Big Wolf Creek | | | 2,000 |
| Buck Lick Creek | | | 1,000 |
| Dority Creek | | | 2,500 |
| Elsey Creek | | | 2,000 |
| Kinsinger Creek | | | 800 |
| Laurel Run | | | 1,200 |
| Little Wolf Creek | | | 3,000 |
| Muddy Creek | | | 1,500 |
| Roaring Creek | | | 2,500 |
| Salt Lick Creek | | | 4,000 |
| Snowy Creek | | | 6,700 |
| Spruce Run | | | 1,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| West Virginia—Continued. | | | |
| Terra Alta, White Oak Creek | | | 2,000 |
| Webster Springs, Elk River, Buck Fork | | | 600 |
| White Sulphur Springs, Laurel Creek | | | 1,000 |
| Spring Branch | | 59,000 | 1,000 |
| Turner Creek | | | 1,000 |
| Wildell, Elk Run | | | 4,000 |
| Mike Run | | | 2,000 |
| Snorting Lick Run | | | 2,000 |
| Wisconsin: | | | |
| Albertville, Little Elk Creek | | | 3,000 |
| Alma, Little Waumandee Creek | | | 2,800 |
| Alma Center, Pigeon Creek | | | 1,200 |
| Almena, Hay River | | | 6,000 |
| Arcadia, Bishop Creek | | | 300 |
| Eagle Valley Creek | | | 300 |
| French Creek | | | 300 |
| Gilman Creek | | | 300 |
| Haines Creek | | | 300 |
| Holcomb Coulee Creek | | | 300 |
| Hunters Creek | | | 300 |
| Kried Valley Creek | | | 300 |
| Lewis Valley Creek | | | 300 |
| Long Creek | | | 300 |
| Mineral Spring Brook | | | 300 |
| Montana Creek | | | 300 |
| Rocky Run Creek | | | 300 |
| Sandy Creek | | | 300 |
| Scharlow Valley Creek | | | 300 |
| Trout Run | | | 300 |
| Auburndale, Mohan Creek | | | 4,000 |
| Augusta, Beamans Creek | | | 600 |
| Bears Grass Creek | | | 800 |
| Beaver Creek | | | 600 |
| Bee Creek | | | 300 |
| Beef River | | | 400 |
| Bridge Creek | | | 600 |
| Browns Creek | | | 300 |
| Chaney Creek | | | 300 |
| Coon Gut Creek | | | 300 |
| Diamond Creek | | | 300 |
| Hathaway Creek | | | 400 |
| Hay Creek | | | 400 |
| Horse Creek | | | 400 |
| Muskrat Creek | | | 400 |
| Otter Creek | | | 800 |
| Sand Creek | | | 300 |
| Thompson Creek | | | 400 |
| Travis Creek | | | 300 |
| Bangor, Adams Creek | | | 400 |
| Big Creek | | | 300 |
| Burns Creek | | | 900 |
| Kalburan Creek | | | 300 |
| Sand Creek | | | 600 |
| Swamp Creek | | | 300 |
| Barneveld, Clavahn Stream | | | 1,000 |
| Four Mile Creek | | | 800 |
| Beldenville, Trimbelle Creek | | | 900 |
| Birchwood, Fullerton Pond | | | 2,700 |
| Black River Falls, Roaring Creek | | | 6,000 |
| Blair, Bear Creek | | | 300 |
| Beaver Creek | | | 300 |
| Lake Coulee Creek | | | 300 |
| Strum Creek | | | 300 |
| Tappan Creek | | | 300 |
| Tennison Creek | | | 300 |
| Vasse Coulee Creek | | | 300 |
| Welsh Coulee Creek | | | 300 |
| Bluff Siding, Bohlies Valley Creek | | | 600 |
| Bohn Valley Creek | | | 1,600 |
| Eagle Valley Creek | | | 1,600 |
| Fox Coulee Creek | | | 1,000 |
| French Creek | | | 1,000 |
| Holcomb Coulee Creek | | | 1,400 |
| Little Tamarack Creek | | | 400 |
| Norwegian Creek | | | 400 |
| Norway Coulee Creek | | | 1,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Bluff Siding, Pine Creek | | | 1,600 |
| Brule, Carlson Creek | | | 2,000 |
| Shade Creek | | | 4,000 |
| Stony Brook | | | 3,000 |
| Cable, Big Run | | | 4,000 |
| Cable Lake Brook | | | 2,000 |
| Caps Creek | | | 2,000 |
| Five Mile Creek | | | 2,000 |
| Garrison Brook | | | 4,000 |
| Lynch Creek | | | 4,000 |
| Namekagon River | | | 8,000 |
| Neffs Brook | | | 2,000 |
| Ole Lake Brook | | | 4,000 |
| Spring Brook | | | 2,000 |
| Twin Brooks | | | 4,000 |
| Cadott, Big Drywood Creek | | | 3,000 |
| Paint Creek | | | 4,000 |
| Willow Creek | | | 1,000 |
| Camp Douglas, Little Lemonweir River | | | 1,000 |
| Cashton, Coon Creek | | | 1,000 |
| Fremstead Creek | | | 1,000 |
| Hanson Creek | | | 1,000 |
| Heiser Creek | | | 1,000 |
| Jersey Creek | | | 1,000 |
| Lyons Creek | | | 1,000 |
| Meissner Creek | | | 1,000 |
| Timber Coulee Creek | | | 1,000 |
| Witchman Creek | | | 1,000 |
| Cassville, Furnace Branch | | | 600 |
| Chippewa Falls, Big Beaver Creek | | | 1,000 |
| Clear Creek | | | 1,000 |
| Drywood Creek | | | 1,000 |
| Duncan Creek | | | 1,000 |
| Eighteen Mile Creek | | | 1,000 |
| Elk Creek | | | 1,000 |
| Hay Creek | | | 1,000 |
| Jims Falls Creek | | | 1,000 |
| Little Beaver Creek | | | 1,000 |
| Little Drywood Creek | | | 1,000 |
| Little Hay Creek | | | 1,000 |
| McCann Creek | | | 1,000 |
| Murphy Creek | | | 1,000 |
| Nicoli Creek | | | 1,000 |
| Paint Creek | | | 1,000 |
| Seth Creek | | | 1,000 |
| Tenmile Creek | | | 1,000 |
| Trout Creek | | | 1,000 |
| Cochrane, Breams Valley Brook | | | 300 |
| Bulls Valley Brook | | | 300 |
| Dannser Valley Brook | | | 300 |
| Esbach Brook | | | 300 |
| Florin Valley Brook | | | 300 |
| Irish Valley Brook | | | 300 |
| Johns Valley Creek | | | 600 |
| Mill Creek | | | 300 |
| Montane Brook | | | 300 |
| Oak Valley Brook | | | 300 |
| Rebhahu Valley Brook | | | 300 |
| Rose Valley Brook | | | 300 |
| Rutschou Brook | | | 300 |
| Schaub Brook | | | 300 |
| Schoepps Valley Brook | | | 300 |
| Schultz Brook | | | 300 |
| Weisenberger Brook | | | 300 |
| Wolf Valley Brook | | | 300 |
| Yaeger Brook | | | 300 |
| Crandon, Andrews Pond | | | 1,000 |
| Drake Creek | | | 1,000 |
| Mud Lake | | | 4,000 |
| Rice Creek | | | 3,000 |
| Swamp Creek | | | 2,000 |
| Wolf River | | | 1,000 |
| Cumberland, Miller Creek | | | 4,500 |
| Dodgeville, Bremker Creek | | | 500 |
| Edmunds Branch | | | 3,000 |
| Hoskins Branch | | | 3,000 |
| Middleberry Creek | | | 800 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Dodgeville, Smith Creek | | | 3,000 |
| Williams Stream | | | 1,500 |
| Drummond, Jaders Creek | | | 4,500 |
| Johnson Creek | | | 1,500 |
| Long Lake Branch | | | 4,500 |
| Durand, Averill Creek | | | 300 |
| Bear Creek | | | 1,200 |
| Big Arkansas Creek | | | 2,000 |
| Big Coulee Creek | | | 1,000 |
| Drier Creek | | | 1,000 |
| Fall Creek | | | 1,200 |
| Fox Creek | | | 300 |
| Gray Creek | | | 300 |
| Heron Creek | | | 1,000 |
| Little Arkansas Creek | | | 2,000 |
| Porcupine Creek | | | 2,000 |
| Spring Creek | | | 600 |
| Eau Claire, Beaver Creek | | | 1,600 |
| Clear Creek | | | 1,600 |
| Coon Creek | | | 1,500 |
| Craft Creek | | | 1,000 |
| Cranberry Creek | | | 800 |
| Deer Creek | | | 500 |
| Eight Mile Creek | | | 1,000 |
| Eighteen Mile Creek | | | 1,000 |
| Elk Creek | | | 2,600 |
| Five Mile Creek | | | 1,500 |
| Grace Creek | | | 400 |
| Hansen Creek | | | 2,000 |
| Little Niagara Creek | | | 300 |
| Little Rock Creek | | | 500 |
| Lowes Creek | | | 1,800 |
| Nine Mile Creek | | | 1,800 |
| North Creek | | | 300 |
| Otter Creek | | | 1,000 |
| Pine Creek | | | 500 |
| Rock Creek | | | 1,600 |
| Sandy Creek | | | 500 |
| Seven Mile Creek | | | 1,500 |
| Sherman Creek | | | 1,600 |
| Spring Creek | | | 1,300 |
| Trout Creek | | | 1,800 |
| Twelve Mile Creek | | | 1,000 |
| West Creek | | | 1,000 |
| Wrights Creek | | | 800 |
| Edgewater, Arfin Creek | | | 1,000 |
| Beaver Creek | | | 1,000 |
| Billikin Springs Creek | | | 2,000 |
| Casey Creek | | | 1,000 |
| Derosier Creek | | | 1,000 |
| Hay Creek | | | 2,000 |
| Laughing Water Creek | | | 1,000 |
| Mallard Creek | | | 1,000 |
| Moose Creek | | | 2,000 |
| Nelson Creek | | | 1,000 |
| Pigeon Creek | | | 2,000 |
| Plum Creek | | | 1,000 |
| Sissebagama Creek | | | 1,000 |
| Trout Creek | | | 2,000 |
| Yarnell Creek | | | 2,000 |
| Elcho, Hunting River | | | 9,000 |
| Eleva, Big Creek | | | 1,000 |
| Trout Creek | | | 1,000 |
| Ellsworth, Brush Creek | | | 3,000 |
| Cave Creek | | | 3,000 |
| Isabelle Creek | | | 3,000 |
| Lost Creek | | | 3,000 |
| Elmwood, Big Mosourie River | | | 4,000 |
| Cady Creek | | | 3,000 |
| Cave Creek | | | 3,000 |
| Eau Galle River | | | 4,000 |
| Plum Creek | | | 4,000 |
| Fairchild, Black Creek | | | 300 |
| Boatman Creek | | | 300 |
| Coon Fork Creek | | | 600 |
| Coon Gut Creek | | | 300 |
| Flick Creek | | | 600 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Fairchild, Johnson Creek | | | 400 |
| McLaren Creek | | | 300 |
| Marrin Creek | | | 300 |
| Pitts Creek | | | 300 |
| Toals Creek | | | 300 |
| Travis Creek | | | 300 |
| Fennimore, Legged Creek | | | 4,500 |
| Fond du Lac, Parson Brook | | | 500 |
| Foxboro, Big Balsam Creek | | | 6,000 |
| Empire Creek | | | 4,000 |
| Little Balsam Creek | | | 4,000 |
| State Line Creek | | | 6,000 |
| Galesville, Beaver Creek | | | 300 |
| Beaver Creek, North Branch | | | 300 |
| Beaver Creek, South Branch | | | 900 |
| Bean Creek | | | 300 |
| Corrigan Creek | | | 300 |
| Coulee Creek | | | 300 |
| Crystal Valley Creek | | | 300 |
| Dutch Creek | | | 300 |
| French Creek | | | 300 |
| Grant Creek | | | 300 |
| Hardy Creek | | | 600 |
| Silver Creek | | | 300 |
| Tamarack Creek | | | 300 |
| Gleason, Eight Mile Creek | | | 2,000 |
| Hay Meadow Creek | | | 2,000 |
| North Branch River | | | 2,000 |
| Pine River | | | 2,000 |
| Silver Creek | | | 2,000 |
| Glenwood, Balons Creek | | | 400 |
| Behrens Creek | | | 400 |
| Beleans Creek | | | 300 |
| Blakely Creek | | | 300 |
| Bolan Creek | | | 400 |
| Browns Creek | | | 300 |
| Camp Nine Creek | | | 300 |
| Conners Creek | | | 300 |
| DeSmith Creek | | | 600 |
| Eldridge Creek | | | 300 |
| Jacobson Creek | | | 300 |
| Johns Creek | | | 300 |
| Little Beaver Creek | | | 400 |
| Morgan Creek | | | 300 |
| Sachse Creek | | | 300 |
| Sand Creek | | | 700 |
| Sullivan Creek | | | 300 |
| Torgeson Creek | | | 300 |
| Vance Creek | | | 400 |
| Grand Rapids, Five Mile Creek | | | 1,000 |
| Green Bay, De Greef's pond | | | 500 |
| Greenwood, Alder Creek | | | 300 |
| Black Creek | | | 2,400 |
| Cawley Creek | | | 500 |
| Colby Creek | | | 2,000 |
| Dickerson Creek | | | 400 |
| Giler Creek | | | 300 |
| Hay Creek | | | 300 |
| Kawley Creek | | | 2,000 |
| Nichol Creek | | | 300 |
| Norwegian Creek | | | 2,400 |
| Rock Creek | | | 500 |
| Rocky Run | | | 2,400 |
| Wedges Creek | | | 500 |
| Hackley, Hackley Creek | | | 3,000 |
| Harshaw, Bearskin Creek | | | 5,000 |
| Little Bear Creek | | | 1,000 |
| Rice Creek | | | 3,000 |
| Heineman, Prairie River | | | 900 |
| Hixton, Amo Creek | | | 1,000 |
| Curran Creek | | | 1,000 |
| Gaulster Creek | | | 1,000 |
| Holmes Creek | | | 1,000 |
| Judkins Creek | | | 1,000 |
| Larson Creek | | | 1,000 |
| Lowe Creek | | | 1,000 |
| Mortiboy Creek | | | 1,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Hixton, Nettleton Creek | | | 1,000 |
| North Branch | | | 1,000 |
| Pine Creek | | | 2,000 |
| Schmerhorn Creek | | | 1,000 |
| Simpson Creek | | | 1,000 |
| Tank Creek | | | 1,000 |
| Timber Creek | | | 1,000 |
| Hudson, Willow River | | | 3,000 |
| Independence, Bennett Valley Creek | | | 300 |
| Borst Valley Creek | | | 1,300 |
| Bruce Valley Creek | | | 1,300 |
| Burt Valley Creek | | | 1,000 |
| Chimney Rock Creek | | | 1,300 |
| Cookes Creek | | | 1,000 |
| Dubil Valley Creek | | | 1,000 |
| Elk Creek | | | 1,300 |
| Elk Creek Pond | | | 300 |
| Engum Creek | | | 1,000 |
| Finright Creek | | | 1,000 |
| Gunderson Creek | | | 1,000 |
| Hawkinson Creek | | | 1,000 |
| Husselgard Creek | | | 1,300 |
| Ignatz Lyga Creek | | | 1,000 |
| Kilniss Creek | | | 1,000 |
| Kurth Valley Creek | | | 1,000 |
| Lyga Creek | | | 1,000 |
| Maloney Creek | | | 1,000 |
| Nelson Valley Creek | | | 1,000 |
| North Branch Creek | | | 1,300 |
| Olson Creek | | | 1,000 |
| Plumb Creek | | | 1,300 |
| Poppies Creek | | | 1,000 |
| Roskos Creek | | | 1,000 |
| Russell Valley Creek | | | 1,000 |
| Rusts Creek | | | 1,000 |
| Schaffners Creek | | | 1,000 |
| Simonson Valley Creek | | | 1,000 |
| Skogstad Creek | | | 1,300 |
| Slanton Creek | | | 1,000 |
| Solfest Creek | | | 1,300 |
| Traverse Valley Creek | | | 1,300 |
| Uetz Creek | | | 1,000 |
| Ulbug Valley Creek | | | 1,000 |
| Vennis Creek | | | 1,000 |
| Zimmer Creek | | | 1,300 |
| Iron River, Iron River | | | 4,000 |
| Muskeg Creek | | | 8,000 |
| Pine Lake | | | 4,000 |
| Kendall, Brainard Creek | | | 300 |
| Davis Creek | | | 300 |
| Oborn Creek | | | 300 |
| Smiths Creek | | | 300 |
| La Crosse, Fays Creek | | | 400 |
| Sand Creek | | | 300 |
| La Farge, Dalton Spring Branch | | | 300 |
| Indian Creek | | | 2,000 |
| North Bar Creek | | | 4,000 |
| Spring Creek | | | 4,000 |
| Lancaster, Austin Branch | | | 3,000 |
| Beathaun Branch | | | 3,000 |
| Borah Branch | | | 3,000 |
| Club Branch | | | 3,000 |
| Day Branch | | | 1,500 |
| McKenzie Branch | | | 1,500 |
| McPherson Branch | | | 1,500 |
| Millner Branch | | | 3,000 |
| Pollock Branch | | | 1,500 |
| Raines Branch | | | 3,000 |
| Trollope Branch | | | 3,000 |
| Walker Branch | | | 3,000 |
| Williams Branch | | | 3,000 |
| Lavalle, McGloy Creek | | | 300 |
| Long Lake, Coldwater Creek | | | 4,000 |
| Manitowoc, Francis Creek | | | 3,000 |
| Hermans Creek | | | 3,000 |
| Mellen, Bad River | | | 10,000 |
| Tyler Forks River | | | 1,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Menomonie, Anderson Creek | | | 800 |
| Annis Creek | | | 800 |
| Asylum Springs Creek | | | 800 |
| Balsbaugh Creek | | | 800 |
| Beaver Creek | | | 800 |
| Big Elk Creek | | | 800 |
| Big Hay Creek | | | 800 |
| Big Meadow Creek | | | 800 |
| Bishop Creek | | | 800 |
| Biss Creek | | | 800 |
| Blairs Creek | | | 800 |
| Boland Creek | | | 1,600 |
| Browns Creek | | | 800 |
| Clarks Creek | | | 800 |
| Coon Creek | | | 800 |
| Cowan Creek | | | 800 |
| Cranberry Creek | | | 800 |
| Dashone Creek | | | 800 |
| Denning Creek | | | 800 |
| Drowleys Spring Creek | | | 800 |
| Eau Galle River | | | 800 |
| Eddy Creek | | | 800 |
| Eighteen Mile Creek | | | 800 |
| Fall Creek | | | 800 |
| Foss Creek | | | 800 |
| Galloway Creek | | | 800 |
| Gilbert Creek | | | 800 |
| Hay River | | | 1,600 |
| Home Farm Creek | | | 800 |
| Iron Creek | | | 800 |
| Irvin Creek | | | 800 |
| John Creek | | | 800 |
| Kings Creek | | | 800 |
| Knights Creek | | | 800 |
| Kripple Creek | | | 800 |
| La Forge Creek | | | 800 |
| Lambs Creek | | | 1,600 |
| Little Beaver Creek | | | 800 |
| Little Elk Creek | | | 800 |
| Little Hay Creek | | | 800 |
| Little Missoni River | | | 800 |
| Little Otter Creek | | | 800 |
| Little Sand Creek | | | 800 |
| Losby Run | | | 800 |
| Louis Creek | | | 800 |
| Lower Pine Creek | | | 800 |
| Lynch Creek | | | 800 |
| McCarthy Creek | | | 800 |
| Missoni River | | | 800 |
| Mud Creek | | | 800 |
| Otter Creek | | | 800 |
| Palmers Run | | | 800 |
| Paradise Creek | | | 800 |
| Parker Springs Creek | | | 800 |
| Popple Creek | | | 800 |
| Roach Creek | | | 800 |
| Rock Creek | | | 800 |
| Rush Creek | | | 800 |
| Sand Creek | | | 800 |
| Shofer Creek | | | 800 |
| Simonson Creek | | | 800 |
| Sinking Creek | | | 800 |
| Sly Creek | | | 800 |
| Smith Creek | | | 800 |
| Spring Creek | | | 800 |
| Stoner Creek | | | 800 |
| Thum Creek | | | 800 |
| Tiffany Creek | | | 800 |
| Torgerson Creek | | | 800 |
| Trout Creek | | | 800 |
| Upper Pine Creek | | | 800 |
| Varney Creek | | | 800 |
| Weber Creek | | | 800 |
| White Creek | | | 800 |
| Wilcox Creek | | | 800 |
| Wilson Creek | | | 1,600 |
| Wolf Run | | | 800 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Merrillan, Arnold Creek | | | 2,000 |
| Cesna Creek | | | 2,700 |
| Clark Creek | | | 300 |
| Farka Creek | | | 1,300 |
| Flood Creek | | | 400 |
| Gearing Creek | | | 1,300 |
| Hall Creek | | | 2,000 |
| Hayden Creek | | | 500 |
| Houghton Creek | | | 300 |
| Hunters Creek | | | 300 |
| Jones Creek | | | 300 |
| Pine River | | | 1,200 |
| Prairie Creek | | | 2,000 |
| Stocknell Creek | | | 600 |
| Van Hersey Creek | | | 1,000 |
| Visneau Creek | | | 1,500 |
| Millston, Alvord Creek | | | 1,000 |
| Clear Creek | | | 1,000 |
| Dunham Creek | | | 1,000 |
| Gebhardt Creek | | | 1,000 |
| Glen Creek | | | 1,000 |
| Hauser Creek | | | 2,000 |
| Indian Creek | | | 1,000 |
| Ketchum Creek | | | 1,000 |
| King Creek | | | 1,000 |
| Lamb Creek | | | 1,000 |
| Lambert Creek | | | 1,000 |
| Merritt Creek | | | 1,000 |
| Mill Creek | | | 1,000 |
| Patterson Creek | | | 1,000 |
| Pigeon Creek | | | 1,000 |
| Pongartz Creek | | | 1,000 |
| Pulling Creek | | | 1,000 |
| Pump Creek | | | 1,000 |
| Robinson Creek | | | 1,000 |
| Rudd Creek | | | 2,000 |
| South Wyman Creek | | | 1,000 |
| Spring Creek | | | 1,000 |
| Stanton Creek | | | 2,000 |
| Wyman Creek | | | 1,000 |
| Mondovi, Adams Creek | | | 300 |
| Bennett Valley Creek | | | 400 |
| Big Creek | | | 300 |
| Brown Creek | | | 300 |
| Carroll Creek | | | 500 |
| Cranberry Creek | | | 500 |
| Dutch Creek | | | 300 |
| Elk Creek | | | 300 |
| Fifteen Creek | | | 300 |
| Ford Creek | | | 600 |
| Gilman Valley Creek | | | 300 |
| Hoovey Creek | | | 500 |
| Merritt Creek | | | 300 |
| Neal Creek | | | 300 |
| Rock Creek | | | 500 |
| Rosman Creek | | | 500 |
| Silver Creek | | | 300 |
| Whelan Creek | | | 300 |
| Muscoda, Booth Hollow Creek | | | 300 |
| Byrds Creek | | | 300 |
| Indian Creek | | | 600 |
| Ludvick Branch | | | 300 |
| Sixmile Branch | | | 300 |
| Wall Branch | | | 300 |
| Nashville, Clear Lake | | | 6,000 |
| Spring Creek | | | 3,000 |
| New Auburn, Duncan Creek | | | 1,000 |
| Sand Creek | | | 600 |
| New Lisbon, White Creek | | | 900 |
| Oregon, Bodfish Creek | | | 4,500 |
| Pepin, Big Plum Creek | | | 600 |
| Bogus Creek | | | 300 |
| Elk Creek | | | 300 |
| Little Plum Creek | | | 300 |
| Lost Creek | | | 300 |
| Porcupine Creek | | | 300 |
| Roaring River | | | 600 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Phipps, McDermott Brook | | | 1,500 |
| Nemokagon River | | | 6,000 |
| Rogers Creek | | | 4,500 |
| Plymouth, Mullet Creek | | | 10,000 |
| Union River | | | 3,000 |
| Rice Lake, Angler Creek | | | 300 |
| Barker Creek | | | 300 |
| Big Bear Creek | | | 1,000 |
| Big Kettle Creek | | | 1,000 |
| Browns Creek | | | 1,000 |
| Cannon Creek | | | 1,000 |
| Cobb Creek | | | 1,000 |
| Cranberry Creek | | | 300 |
| Desair Creek | | | 300 |
| German Creek | | | 1,000 |
| Hay River | | | 1,000 |
| Heger Creek | | | 300 |
| Hemlock Creek | | | 300 |
| Kegamo Creek | | | 1,000 |
| Little Bear Creek | | | 300 |
| Little Spring Creek | | | 300 |
| Long Lake Stream | | | 1,000 |
| Meadow Creek | | | 1,000 |
| Miller Creek | | | 300 |
| Moosier Creek | | | 1,000 |
| Mud Creek | | | 1,000 |
| Olson Creek | | | 1,000 |
| Overby Creek | | | 1,300 |
| Pekegamo Creek | | | 300 |
| Prairie Creek | | | 300 |
| Renville Creek | | | 1,000 |
| Rice Creek | | | 1,000 |
| Savage Creek | | | 1,000 |
| Silver Creek | | | 300 |
| South Creek | | | 300 |
| Spoon Creek | | | 1,000 |
| Spring Creek | | | 300 |
| Spur Nine Brook | | | 300 |
| Sucker Creek | | | 1,000 |
| Weiss Creek | | | 1,000 |
| West Branch | | | 300 |
| Yellow River | | | 300 |
| Richland Center, Ash Creek | | | 600 |
| Fancy Creek | | | 600 |
| Little Willow Creek | | | 600 |
| Melancthon Creek | | | 600 |
| Pine River | | | 200 |
| Ridgeway, Mill Creek | | | 1,000 |
| River Falls, Kinnickinnic Creek | | | 900 |
| Nye Creek | | | 600 |
| South Fork River | | | 900 |
| Rosendale, Silver Creek | | | 600 |
| Solon Springs, Ox Creek | | | 1,500 |
| Sparta, Beaver Creek | | | 300 |
| Big Creek | | | 1,100 |
| La Crosse River | | | 400 |
| Little La Crosse River | | | 400 |
| Sargent Creek | | | 300 |
| Silver Creek | | | 300 |
| Soper Creek | | | 300 |
| Sparta Creek | | | 300 |
| Squaw Creek | | | 300 |
| Tarr Creek | | | 300 |
| Tuttles Creek | | | 300 |
| Walworth Creek | | | 300 |
| Spring Valley, Bahrs Creek | | | 300 |
| Burghardt Creek | | | 300 |
| Cady Creek | | | 300 |
| Cave Creek | | | 600 |
| Eagle Springs | | | 300 |
| French Creek | | | 300 |
| Gilbert Creek | | | 1,200 |
| Jacobson Creek | | | 300 |
| Johnson Creek | | | 300 |
| Lohns Creek | | | 300 |
| Lousy Creek | | | 600 |
| Mines Creek | | | 300 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Spring Valley, Rush River | | | 1,200 |
| Stanley, Hay Creek | | | 4,000 |
| Swim Creek | | | 3,000 |
| Stitzer, Bald Branch | | | 4,500 |
| Leggett Branch | | | 4,500 |
| Superior, Wisconsin Creek | | | 6,000 |
| Thorp, Bolin Creek | | | 2,000 |
| Lost Creek | | | 2,000 |
| Sterling Creek | | | 3,000 |
| Tomah, Brandy Creek | | | 2,000 |
| Council Creek | | | 2,000 |
| Deer Creek | | | 1,000 |
| Dodgeville Creek | | | 2,000 |
| Jennings Creek | | | 2,000 |
| Mill Creek | | | 2,000 |
| Mud Creek | | | 1,000 |
| Sand Creek | | | 2,000 |
| Silver Creek | | | 1,000 |
| Sparta Creek | | | 2,000 |
| Spring Bank Pond | | | 1,000 |
| Viola, Church Creek | | | 3,000 |
| Viroqua, Bishop Branch | | | 4,000 |
| Cotter Creek | | | 2,000 |
| Duck Eggs Branch | | | 1,000 |
| Pine Hollow Creek | | | 1,000 |
| See Branch | | | 1,000 |
| Warrens, Beltz Creek | | | 300 |
| Brandy Creek | | | 300 |
| Castle Rock Creek | | | 300 |
| Dampka Creek | | | 300 |
| Fish Creek | | | 300 |
| Harp Creek | | | 300 |
| Lowrie Creek | | | 300 |
| Matchett Creek | | | 300 |
| Sand Creek | | | 300 |
| Second Creek | | | 300 |
| Wausau, Jim More Creek | | | 4,000 |
| Wautoma, Beebe Creek | | | 3,800 |
| Birch Creek | | | 600 |
| Bird Creek | | | 2,000 |
| Chafee Creek | | | 3,000 |
| Lunch Creek | | | 3,000 |
| Pine Creek | | | 2,600 |
| Wedde Creek | | | 2,000 |
| White River | | | 3,000 |
| Westby, Bad Axe River | | | 1,200 |
| Clear Branch | | | 300 |
| Clockmakers Creek | | | 2,300 |
| Coon Creek | | | 2,300 |
| Crumo Spring Creek | | | 2,000 |
| Dauve Spring | | | 300 |
| Down Vele Creek | | | 1,000 |
| Kickapoo Creek | | | 1,200 |
| Knapp Creek | | | 1,300 |
| North Bad Axe River | | | 900 |
| Paulsrud Creek | | | 300 |
| Paulson Creek | | | 600 |
| Sanding Creek | | | 1,300 |
| Seas Branch | | | 2,000 |
| Sherve Creek | | | 1,000 |
| Spring Coulee Creek | | | 2,000 |
| Spring Valley Creek | | | 300 |
| Sveen Creek | | | 2,000 |
| Timber Coulee Creek | | | 2,000 |
| Timber Valley Creek | | | 300 |
| Van Ruden Creek | | | 2,300 |
| West Salem, Adams Valley Creek | | | 400 |
| Bostwicks Valley Creek | | | 400 |
| Burns Creek | | | 400 |
| Cliff McClintock Creek | | | 300 |
| Gilles Coulee Creek | | | 300 |
| Green Creek | | | 300 |
| Holberg Creek | | | 300 |
| Johnson Creek | | | 300 |
| Jones Creek | | | 600 |
| Kincade Creek | | | 300 |
| Larson Creek | | | 300 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

BROOK TROUT—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| West Salem, Louis Valley Creek | | | 490 |
| Luce Creek | | | 300 |
| McEldowney Creek | | | 600 |
| Martin Creek | | | 300 |
| Memkings Creek | | | 300 |
| Rackley Creek | | | 300 |
| Raum Creek | | | 300 |
| Ruland Creek | | | 300 |
| Thronsen Creek | | | 400 |
| Tousche Creek | | | 300 |
| Young Creek | | | 300 |
| Wheeler, Big Beaver Creek | | | 1,000 |
| Big Otter Creek | | | 1,000 |
| Blank Creek | | | 1,000 |
| Carey Creek | | | 1,000 |
| Hay River | | | 1,000 |
| La Forge Creek | | | 1,000 |
| Lambs Creek | | | 1,000 |
| Little Beaver Creek | | | 1,000 |
| Little Otter Creek | | | 1,000 |
| Page Creek | | | 1,000 |
| Whitehall, Barlow Valley Creek | | | 300 |
| Beaver Creek | | | 300 |
| Bruce Valley Creek | | | 300 |
| Elk Creek | | | 600 |
| Fly Creek | | | 300 |
| Hay Creek | | | 300 |
| Irvine Creek | | | 300 |
| North Valley Creek | | | 300 |
| Pigeon Creek | | | 300 |
| Wild Rose, Willow Creek | | | 800 |
| Willard, Cameron Creek | | | 600 |
| Tinning Horn Creek | | | 500 |
| Wilton, Adrian Creek | | | 300 |
| Beacher Creek | | | 1,500 |
| Hibbard Creek | | | 300 |
| Kinney Creek | | | 300 |
| Sinks Creek | | | 3,300 |
| Slaten Creek | | | 300 |
| Waege Creek | | | 1,500 |
| Winneboujou, Big Lake | | | 2,000 |
| Black Hoof Creek | | | 4,000 |
| Brule River | | | 23,000 |
| Cutler Creek | | | 2,000 |
| Govan Springs Pond | | | 2,000 |
| Lake Florence | | | 4,000 |
| Little Brule River | | | 2,000 |
| Lucius Lake | | | 2,000 |
| Miles Creek | | | 2,000 |
| Rock Creek | | | 2,000 |
| Sandy Run | | | 2,000 |
| Stones Creek | | | 2,000 |
| Wheatons Creek | | | 2,000 |
| Wyoming: | | | |
| Clark, Clarks Fork River | | | 2,000 |
| Green River, Green River | | | 6,000 |
| Kemmerer, Rock Creek | | | 3,000 |
| Lander, Cabin Lake | | | 2,500 |
| Hobbs's lake | | | 2,500 |
| Popo Agie River | | | 2,500 |
| Upper Lake | | | 2,500 |
| Laramie, Laramie River | | | 5,500 |
| Willow Creek | | | 10,000 |
| Manhattan, Spotted Tail Creek | | | 12,500 |
| Yellowstone National Park, Glen Creek | | | 5,000 |
| Indian Creek | | | 15,000 |
| Willow Creek | | | 20,000 |
| Japan: | | | |
| Tokyo, Japanese Government | 5,000 | | |
| Total[a] | 516,000 | 7,365,945 | 4,085,174 |

[a] Lost in transit, 23,600 fry and 158,687 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNAPEE TROUT.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| New Hampshire: | | | |
| Lake Sunapee, Lake Sunapee | | 115,029 | |
| Newbury, Lake Sunapee | | 56,000 | |
| Total | | 171,029 | |

GRAYLING.

| | | | |
|---|---|---|---|
| Montana: | | | |
| Lakeview, Elk Creek | | 16,000 | |
| Elk Lake | | 65,000 | |
| Washington: | | | |
| Seattle, Exposition Aquarium | | | 18 |
| Wyoming: | | | |
| Sheridan, Bear Creek | 25,000 | | |
| Total | 25,000 | 81,000 | 18 |

SMELT.

| | | | |
|---|---|---|---|
| Maryland: | | | |
| Mountain Lock, Potomac River | | | 9,000 |
| New York: | | | |
| Raquette Lake, Lake Kora | 4,500,000 | | |
| Total | 4,500,000 | | 9,000 |

PIKE.

| | | | |
|---|---|---|---|
| Iowa: | | | |
| Lime Springs, Upper Iowa River | | | 700 |
| North McGregor, Mississippi River | | | 1,900 |
| Minnesota: | | | |
| Brownsville, Mississippi River | | | 18,650 |
| Wisconsin: | | | |
| Genoa, Mississippi River | | | 500 |
| La Crosse, Mississippi River | | | 19,650 |
| Prairie du Chien, Mississippi River | | | 1,900 |
| Total | | | 43,300 |

PICKEREL.

| | | | |
|---|---|---|---|
| Wisconsin: | | | |
| Genoa, Mississippi River | | | 166 |
| La Crosse, Mississippi River | | | 168 |
| Victory, Mississippi River | | | 166 |
| Total | | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| **Arkansas:** | |
| Harrell, Spring Dale Pond | 70 |
| Helena, Blue Hole | 7,000 |
| Long Lake | 22,200 |
| Mississippi River | 145,610 |
| Junction, Spring Lake | 70 |
| Nashville, Mine Creek | 250 |
| Patmos, Mental Pond | 100 |
| Stamps, Mucille Lake | 60 |
| Price Pond | 185 |
| Washington, Allen's pond | 100 |
| **Connecticut:** | |
| Danbury, Kellogg's pond | 250 |
| Wolf Pond | 250 |
| New Haven, Granniss Lake | 200 |
| **Illinois:** | |
| Avena, Willow Lake | 200 |
| Belleville, Club Pond | 150 |
| Heinemann's lake | 400 |
| Carbondale, Club Lake | 200 |
| Simons Lake | 200 |
| Carterville, Peyton's pond | 250 |
| Donnellson, Clover Leaf Lake | 150 |
| East Hannibal, Sni E'Carte River | 750 |
| Herrin, Manning Pond | 500 |
| Mine Pond | 500 |
| Hillsboro, Seymour Club Lakes | 300 |
| Lake Forest, Whitehall Pond | 320 |
| **Indiana:** | |
| Haubstadt, Oak Summit Pond | 100 |
| Lebanon, Bramble Gravel Pit | 100 |
| Paoli, Willow Lake | 100 |
| Richmond, Crystal Lake | 200 |
| Shell Brook Pond | 200 |
| **Iowa:** | |
| Algona, Upper Des Moines River, East Branch | 400 |
| Fort Madison, Green Bay | 125 |
| Independence, Wapsipinicon River | 400 |
| North McGregor, Mississippi River | 46,000 |
| Stockport, Silver's pond | 100 |
| **Kansas:** | |
| Caldwell, Bluff Creek | 1,000 |
| Farlington, Mitchell's pond | 25 |
| **Kentucky:** | |
| Bradford, Locust Brook Pond | 100 |
| Meadow Brook Pond | 100 |
| Campbellsburg, Sanford Pond | 100 |
| Cropper, Willow Pond | 100 |
| Emmons, Breezy Heights Pond | 100 |
| Lebanon, Graham's pond | 150 |
| Rogers's pond | 150 |
| Louisville, Cemetery Lake | 100 |
| Lake Lansdowne | 300 |
| St. Mary, Forester Lake | 200 |
| **Louisiana:** | |
| Athens, Gandy's pond | 100 |
| Marsalis Pond | 100 |
| Bernice, Chalybeate Spring Pond | 70 |
| Heard's pond | 70 |
| Keatchie, China Grove Lake | 100 |
| Mansfield, Bickerstaff Lake | 150 |
| Brick Company's pond | 100 |
| Many, Hoagland's pond | 130 |
| Quitman, Harvey's pond | 70 |
| Spring Lake | 70 |
| Ruston, Hancock's pond | 100 |
| **Maryland:** | |
| Mountain Lock, Potomac River | 247 |
| Prince George County, Goodloe's pond | 100 |
| **Minnesota:** | |
| Brownsville, Mississippi River | 43,250 |
| Rochester, Zumbro Mill Pond | 20 |
| Wheaton, Lake Traverse | 200 |

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| **Mississippi:** | |
| Booneville, Beach Bluff Lake | 100 |
| Hollaway Lake | 100 |
| Red Elm Lake | 200 |
| Columbus, Mullins Lake | 100 |
| Corinth, Lake Billsville | 250 |
| Macon, Poplar Lake | 100 |
| Willow Glen Pond | 100 |
| Noxapater, Estes's pond | 100 |
| Philadelphia, Spring Pond | 100 |
| Tupelo, Sterns's pond | 100 |
| West Point, Fortson Lake | 100 |
| **Missouri:** | |
| Aurora, Crane Creek | 300 |
| Butler, Lake Katherine | 100 |
| Higginsville, Railroad Pond | 275 |
| Mount Vernon, Honey Creek | 300 |
| Hoshaw Lake | 200 |
| Jaggerman Lake | 200 |
| Johnson's lake | 200 |
| Spring River | 400 |
| Nevada, Katy Allen Lake | 100 |
| Springfield, Walnut Spring Lake | 200 |
| Warrensburg, Meily's lake | 100 |
| West Plains, Carter's pond | 100 |
| Willow Springs, Maple Pond | 100 |
| **New York:** | |
| Albany, Stevens's pond | 100 |
| Newark, Asylum Reservoir | 100 |
| **North Carolina:** | |
| Hendersonville, Jane Mill Pond | 200 |
| Lake Osceola | 300 |
| Rainbow Lake | 150 |
| **North Dakota:** | |
| Berlin, Rush Pond | 55 |
| Fullerton, Appelquist Pond | 100 |
| Glen Ullin, Sprecher's pond | 100 |
| Hankinson, Lake Elsie | 200 |
| Lisbon, Prairie Farm Lake | 100 |
| **Ohio:** | |
| Bradford, Greenville Creek | 350 |
| Covington, Stillwater River | 250 |
| Gettysburg, Greenville Creek | 250 |
| Winton Place, Hollywood Lake | 200 |
| **Oklahoma:** | |
| Alva, Harbaugh Lake | 175 |
| Apache, Morgan's ponds | 100 |
| Spring Pond | 50 |
| Sturman's pond | 50 |
| Wogan's pond | 50 |
| Ardmore, Camp Brown Creek | 400 |
| Edward's pond | 300 |
| Hickory Creek | 200 |
| Love's lake | 300 |
| Silver Lake | 400 |
| Barron Fork, Yonah Pond | 100 |
| Bliss, Arkansas River | 200 |
| Canute, Turkey Pond | 150 |
| Chouteau, Bledsoe Pool | 100 |
| Cleveland, Silver Lake | 100 |
| Cushing, Willow Pond | 100 |
| Elgin, South Side Farm Pond | 50 |
| El Reno, Nettie Ruth Lake | 300 |
| Fletcher, Cox Reservoir | 150 |
| Gracemont, Walnut Grove Pond | 100 |
| Marietta, Black Lake | 50 |
| McKinney's pond | 65 |
| Smith's pond | 50 |
| Washington Lake | 50 |
| Noble, Appleby's pond | 50 |
| Oklahoma City, Deepwater Lake | 150 |
| Fickis's pond | 175 |
| Gaylord's pond | 200 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

CRAPPIE AND STRAWBERRY BASS—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Oklahoma—Continued. | |
| Oklahoma City, Gum's lake | 200 |
| Turner's lake | 100 |
| Oologah, Sunday's pond | 100 |
| Pawhuska, Clear Creek | 100 |
| Snyder, Deep Pond | 150 |
| Terral, Ewing's lake | 100 |
| Yukon, Kralick Run | 100 |
| Pennsylvania: | |
| Falls Station, Lake Winola | 200 |
| York, Codorus Creek, South Branch | 150 |
| South Carolina: | |
| Aiken, Black Poplar Pond | 100 |
| Belton, Belton Mills Pond | 100 |
| Bishopville, Kelley's lake | 125 |
| Central, Arnold's pond | 100 |
| Chappells, Mills Pond | 100 |
| Scurry Pond | 100 |
| Webb's pond | 100 |
| Clover, Campbell's pond | 75 |
| Darlington, Creek Pond | 150 |
| Fair Forest, Fair Forest Creek | 100 |
| Fountain Inn, Durbin Creek Pond | 100 |
| Greenville, Saluda Silver Lake | 200 |
| Rembert, Evans's pond | 125 |
| Wateree, Griffin Creek Pond | 100 |
| Yorkville, Turkey Creek Pond | 100 |
| Tennessee: | |
| Somerville, Allbright's lake | 200 |
| Texas: | |
| Albany, Kellum's pond | 30 |
| Broyle's pond | 30 |
| Waterworks Pond | 100 |
| Annona, Capital Lake | 40 |
| Arlington, Jones's pond | 30 |
| Artesia, McWhorter's reservoir | 20 |
| Athens, Gauntt's lake | 15 |
| Koon Kreek Klub Lake | 100 |
| Prater's lake | 20 |
| Atlanta, Warren's lake | 40 |
| Austin, Austin Lake | 50 |
| Slaughter Lake | 100 |
| Windy Crest Lake | 30 |
| Bay City, Austin's pond | 20 |
| Water Works Pond | 20 |
| Beckville, Parker's lake | 100 |
| Big Sandy, Big Sandy Lake | 50 |
| Lake Everman | 100 |
| Robinson's lake | 50 |
| Blossom, Patton's pond | 26 |
| Brazoria, State Farm Lake | 50 |
| Canyon City, Paloduro Creek | 100 |
| Spring Creek Lake | 100 |
| Carmona, Carmona Pond | 40 |
| Carthage, Davis's lake | 50 |
| Prior's pond | 100 |
| Center Point, Guadalupe River | 100 |
| Verde Creek | 100 |
| Childers, Lake Scott | 200 |
| Clarksville, Clear Lake | 50 |
| Grassy Lake | 100 |
| Round Lake | 100 |
| Coleman, Coleman Lake | 100 |
| Lost Creek | 100 |
| Santa Anna Branch | 100 |
| Sunnyside Lake | 75 |
| Coolidge, Karner Lake | 30 |
| Copperas Cove, Dewald's pond | 20 |
| Corsicana, Corsicana Fish Association Pond | 50 |
| Water Works Lake | 40 |
| Cotulla, Cartwright's reservoir | 40 |
| Counter Switch, Country Club Lake | 175 |
| Crockett, Daniel's lake | 30 |
| Dallas, Munger's pond | 20 |

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Texas—Continued. | |
| De Kalb, Crump's pond | 30 |
| Detroit, Oil Mill Pond | 30 |
| Elgin, Elgin Lake | 20 |
| Elkhart, Elkhart Lake | 100 |
| Farwell, Hamlin Pond | 31 |
| Fort Worth, Lake Homewood | 140 |
| Garrison, Cedar Lake | 50 |
| Giddings, Fisher's pond | 65 |
| Jaehne's pond | 30 |
| Raube's lake | 30 |
| Sumfi's pond | 25 |
| Symm's pond | 30 |
| Thonig Pond | 30 |
| Toepper's pond | 25 |
| Volkers's pond | 30 |
| Graham, Norris's lake | 106 |
| Oak Grove Pond | 50 |
| Worthington Knox Lake | 50 |
| Grand Saline, Malone Pond | 20 |
| Grapeland, Tyers Lake | 50 |
| Willow Lake | 30 |
| Groveton, Friday's pond | 30 |
| Nelms's lakes | 80 |
| Hamlin, Red Lake | 20 |
| Haysland, Lake Shelby | 75 |
| Honey Grove, Fin and Feather Club Lake | 100 |
| Jacksboro, Cooper Lake | 50 |
| Mays Lake | 20 |
| Jacksonville, Hillside Lake | 75 |
| Jordan Lake | 75 |
| Park Lake | 75 |
| Sampson Lake | 100 |
| Shearn Lake | 75 |
| Jonesville, Lake Sand Hill | 100 |
| Kaufman, Bond's pond | 10 |
| Gilmore Lake | 100 |
| Hatch Pond | 20 |
| Hindman's pond | 20 |
| Sand Lake | 20 |
| Taylor's pond | 50 |
| Warrenskjold Lave Lake | 20 |
| Kemp, Long Lake | 100 |
| Kent, Tatum's pond | 25 |
| Kerrville, Turtle Creek Pond | 30 |
| Lampasas, Collins's pond | 20 |
| Lillian, Reese Branch Pond | 40 |
| Llano, Llano Lake | 315 |
| Longview, Beale Lake | 75 |
| Fisher Lake | 75 |
| Lake Lomond | 100 |
| Lovelady, Duck Lake | 100 |
| Kelley Pond | 20 |
| McDade, Milton's pond | 20 |
| Manchaca, Bear Creek | 50 |
| Marshall, Bentley Lake | 30 |
| Bonita Lake | 100 |
| Lake Ferns | 100 |
| Thelma Lake | 60 |
| Mart, Club Lake | 150 |
| Midlothian, Cooper's lake | 40 |
| Mineola, Goldsmith's pond | 30 |
| Mineral Wells, Kearby Tank | 25 |
| Mount Calm, Nelson Pond | 10 |
| Stovall Pond | 40 |
| Mount Selman, Brock's lake | 30 |
| Mayfield's pond | 20 |
| Naples, Naples Club Lake | 15 |
| Walker's pond | 30 |
| Nash, Earnest's lake | 100 |
| Normanna, Blackburn's pond | 28 |
| Paige, Gropp Pond | 30 |
| Horn's pond | 20 |
| Palestine, Bear Lake | 200 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### CRAPPIE AND STRAWBERRY BASS—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Texas—Continued. | |
| Palestine, Cartmell's lake | 20 |
| East Side Park Pond | 30 |
| Wallace Lakes | 40 |
| Paris, Stannard's pond | 20 |
| Willow Lake | 30 |
| Petty, Fielding Lake | 100 |
| Queen City, Prator's pond | 20 |
| Rockdale, Clear Lake | 50 |
| Rotan, Willingham Pond | 100 |
| Royston, Brooks's pond | 30 |
| California Creek Lake | 50 |
| Henry's tank | 50 |
| Stephens's tank | 100 |
| Saginaw, Kane's pond | 35 |
| San Angelo, Concho River, Middle and South Forks | 133 |
| Dove Creek | 60 |
| Kickapoo Creek | 133 |
| Water Valley Country Club Lakes | 74 |
| San Antonio, Lamm's tank | 30 |
| Mitchell Lake | 100 |
| San Marcos, Blue Hole Pond | 25 |
| Saron, William Lake | 30 |
| Sulphur Springs, Elberta Lake | 100 |
| Picnic Lake | 50 |
| Thomas Lake | 50 |
| Taylor, Roberts's lake | 20 |
| Temple, Lake Polk | 75 |
| Terrell, Bass Lake | 20 |
| County Club Lake | 75 |
| Elm Pond | 50 |
| Green Lake | 20 |
| Grinnan Pond | 20 |
| High Point Creek | 75 |
| Martin Pond | 30 |
| Muckleroy Pond | 40 |
| Sargent Pond | 20 |
| Timpson, Bussey's pond | 20 |
| McWilliams's pond | 20 |
| Tye, Crawford Lakes | 25 |
| Tyler, Clear Spring Lake | 50 |
| DeLay's lake | 100 |
| Lake Park Lake | 100 |
| Lakewood Country Club Lake | 100 |
| Murphy's pond | 30 |
| Texas—Continued. | |
| Tyler, Pine Hill Lake | 30 |
| Tyler Fin Club Lake | 100 |
| Waco, Katy Club Lake | 100 |
| Wills Point, Imperial Lake | 100 |
| Virginia: | |
| Culpeper, Englands Mill Pond | 200 |
| Dillwyn, Fitzgerald Pond | 125 |
| Fredericksburg, Boscobel Pond | 500 |
| Leesburg, Goose Creek | 300 |
| Lynchburg, Murrell Pond | 100 |
| Midlothian, Midlothian Pond | 100 |
| Natural Bridge, Cedar Creek | 400 |
| Petersburg, Belschers Pond | 150 |
| Hauslik Pond | 325 |
| Spicer Pond | 200 |
| Richmond, Crittenden Pond | 200 |
| Darbytown Pond | 200 |
| Fulton Fishing Club Pond | 200 |
| Selden's pond | 200 |
| Rockfish, Rockfish Lake | 200 |
| Scottsville, Chester Pond | 100 |
| Soudan, Grass Creek | 200 |
| Suffolk, Lake Savage | 200 |
| Sweet Briar, Sweet Briar Lake | 200 |
| Winterpock, Indian Spring Pond | 150 |
| Zuni, Joyner's pond | 200 |
| Richardson's pond | 200 |
| West Virginia: | |
| Blueton, Holley's pond | 150 |
| Philippi, Middle Fork River | 400 |
| Salisbury, Salisbury's pond | 200 |
| Wisconsin: | |
| Genoa, Mississippi River | 5,832 |
| Independence, New City Pond | 250 |
| Kewaskum, Beachwood Lake | 200 |
| La Crosse, Mississippi River | 49,086 |
| Millston, Polley Creek | 200 |
| Mosmee, Half Moon Lake | 350 |
| Prairie du Chien, Mississippi River | 46,000 |
| State Line, Pickerel Lake | 200 |
| Victory, Mississippi River | 3,332 |
| Wausau, Lake Wausau | 400 |
| O'Day Lake | 250 |
| Silver Creek Bay | 400 |
| Total[a] | 410,428 |

### ROCK BASS.

| | |
|---|---|
| Alabama: | |
| Fivepoints, Poplar Springs | 100 |
| Arizona: | |
| Wilcox, McComb Ranch Pond | 100 |
| Arkansas: | |
| DeQueen, Gantlon's pond | 500 |
| Gravette, Dow's pond | 250 |
| Harrison, Estes's pond | 400 |
| Helena, Mississippi River | 9,915 |
| Mena, Irons Fork River | 500 |
| Mountain Fork River | 500 |
| Ouachita River | 500 |
| Prairie Creek | 500 |
| Rock Creek | 500 |
| Twomile Creek | 500 |
| Pine Bluff, Trigg's pond | 200 |
| Connecticut: | |
| New Haven, Hubinger's lake | 500 |
| Georgia: | |
| Etowah, Hill's pond | 100 |
| Ringgold, Tiger Creek | 300 |
| Illinois: | |
| Belleville, Club Pond | 100 |
| Carbondale, Thompson's lake | 300 |
| Donnelison, Cherry Grove Pond | 100 |
| Wilson's pond | 200 |
| DuQuoin, Egyptian Pond | 100 |
| McLeansboro, Gochring's pond | 100 |
| Indiana: | |
| Bloomfield, Richland Creek | 550 |
| Boonville, Hemenway's pond | 500 |
| Carlisle, Wellington Pond | 150 |
| Cory, Prairie Lake | 200 |
| Woodland Lake | 200 |
| Danville, Soper's pond | 200 |
| Evansville, Clear Pond | 150 |
| Stringtown Springs Pond | 150 |
| Fairmont, Brookshire's pond | 100 |
| Fort Branch, Symond's pond | 100 |
| Greencastle, Lake Woodland | 200 |
| Greentown, Ayres's pond | 100 |
| Macy, Baker's pond | 100 |

[a] Lost in transit, 9,049 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

ROCK BASS—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Indiana—Continued. | |
| Plainfield, Spright's pond | 500 |
| Seymour, Bars Pond | 200 |
| Kasting's pond | 200 |
| Summitville, McLain's pond | 100 |
| Wawaka, Fountain View Pond | 100 |
| Winchester, Gravel Pit Pond | 100 |
| Iowa: | |
| Manchester, Maquoketa River | 325 |
| Kansas: | |
| Chanute, Durey Pond | 100 |
| Cherokee, Allen Pond | 150 |
| Farlington, Mitchell's pond | 150 |
| Leavenworth, Park Lake | 200 |
| Marion, Bruno Creek | 50 |
| East Creek | 50 |
| French Creek | 50 |
| Lyons Creek | 50 |
| Medicine Lodge, Houchin's pond | 100 |
| Kauffman's pond | 100 |
| Peabody, Calbeck's pond | 50 |
| Kentucky: | |
| Beaver Creek, Hindman Pond | 125 |
| May's pond | 125 |
| Buechel, Blankenbeker's pond | 200 |
| Campbellsville, Creel's pond | 175 |
| Cropper, Turnpike Pond | 100 |
| Dover, Jennings Pond | 150 |
| Lebanon, McElroy's pond | 175 |
| Lexington, Lake Callahan | 400 |
| Louisville, Parkview Club Lake | 200 |
| Schroerluecke's pond | 200 |
| Paris, Brannon's pond | 100 |
| Clarke's pond | 100 |
| Clay Pond | 100 |
| Edwards Pond | 100 |
| Frazier Pond | 100 |
| Grayson Pond | 100 |
| Hedge Pond | 100 |
| Jackson's pond | 100 |
| Maher's pond | 100 |
| Paynes Pond | 100 |
| Purnell's pond | 100 |
| Vimont's pond | 100 |
| Watson Pond | 100 |
| Wiggins Pond | 100 |
| Shawhan, Estes's pond | 100 |
| Ewalt's pond | 100 |
| Winchester, Twomile Creek | 200 |
| Louisiana: | |
| Arcadia, Boone's springs | 100 |
| Grand Cane, Grand Cane Creek Pond | 100 |
| Homer, Gandy's pond | 100 |
| Maryland: | |
| Ijamsville, Quynn's pond | 200 |
| Monrovia, Cashour's pond | 200 |
| Mountain Lock, Potomac River | 2,010 |
| Thurmont, Hemler's pond | 230 |
| Michigan: | |
| Bath, Park Lake | 200 |
| Minnesota: | |
| Rochester, Zumbro River, South Branch | 200 |
| Mississippi: | |
| Guntown, Cochran's pond | 100 |
| Pontotoc, Gardner's pond | 125 |
| Highland Fish Co. Lake | 100 |
| Patterson's pond | 125 |
| Ripley, Keenin's pond | 100 |
| Missouri: | |
| Butler, Lake Catherine | 5,000 |
| Glasgow, Steinmetz Pond | 100 |
| Holmes, Dunlap's lake | 100 |
| Joplin, Wild Cat Spring | 200 |
| Marshall, Stedem Pond | 100 |

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Missouri—Continued. | |
| Merwin, Corbin's ponds | 3,000 |
| Mount Vernon, Gillingham's pond | 250 |
| Skinner's pond | 250 |
| Tillotson's spring | 200 |
| Truitts Creek | 750 |
| Williams Creek | 500 |
| Neosho, Twin Springs | 500 |
| New Mexico: | |
| Ancho, Cooper's lake | 200 |
| Carlsbad, Dark Canon Creek | 225 |
| Deming, Knowles's pond | 100 |
| Peterson's pond | 100 |
| Ramsey's pond | 100 |
| Texico, Crescent Pond | 100 |
| Tularosa, Silver Lake | 200 |
| Vermigo Park, Adams Lake | 300 |
| New York: | |
| Dover Plains, Lake Ellis | 100 |
| Great River, Timber Point Pond | 100 |
| Middletown, Wallkill Creek | 400 |
| New Windsor, Walker's lake | 100 |
| North Carolina: | |
| Carthage, Hannon's pond | 150 |
| Durham, Ellis's pond | 75 |
| Fayetteville, Cross Creek | 50 |
| Mollett Pond | 50 |
| Hendersonville, Lily Pond | 150 |
| Mebane, Lake Weda | 75 |
| White Pond | 75 |
| Salisbury, Josey's pond | 75 |
| Star, Hursey Spring Pond | 150 |
| Wake Forest, Walthonia Fish Club Pond | 385 |
| Weldon, Gooch's pond | 75 |
| Ohio: | |
| Bidwell, Jones's pond | 100 |
| Blanchester, Reeves's pond | 100 |
| Chardon, Charlotte Pond | 150 |
| East Palestine, Freed's pond | 200 |
| Fremont, Sandusky River | 500 |
| Ironton, Howell's pond | 100 |
| Kansas, Feasel Quarry Pond | 100 |
| Marion, Whetstone River | 250 |
| Springfield, Little Miami River | 300 |
| Summit, Summit Lake | 200 |
| Wickliffe, Morris Reservoir | 100 |
| Oklahoma: | |
| Chickasha, Harness Pond | 150 |
| Crescent, Crescent Lake | 50 |
| Osborn's pond | 50 |
| Elgin, Glenn Pond | 150 |
| Guthrie, Hawley's pond | 142 |
| Highland Lake | 141 |
| Red Lake | 142 |
| Hillsdale, Coldwater Creek | 50 |
| Lawton, Markeson's pond | 250 |
| Marlow, Jorgeson Pond | 100 |
| Newkirk, Lake Vanderpool | 100 |
| Santa Fe Lake | 50 |
| Okeene, Seigfreid's pond | 50 |
| Perry, Clear Lake | 50 |
| Watson's pond | 50 |
| Willet's pond | 50 |
| Ponca, Bell Lake | 50 |
| South Coon Creek | 50 |
| Purcell, Brewer's lake | 30 |
| Tryon, Bermuda Lakes | 50 |
| Wanette, Laughlin's pond | 100 |
| Weatherford, Bear Creek Pond | 30 |
| Pennsylvania: | |
| Birdsboro, Hay Creek | 200 |
| Bushkill, Delaware River | 1,200 |
| Indiana, Yellow Creek | 300 |
| Marion, Back Creek | 400 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### ROCK BASS—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Pennsylvania—Continued. | |
| Marion, Conococheague Creek | 400 |
| Rowlands, Lackawaxen River | 600 |
| Weissport, Big Creek | 300 |
| Rhode Island: | |
| Barrington Center, Wood's pond | 200 |
| South Carolina: | |
| Blacksburg, Bear Creek | 100 |
| Clover, Camp Run | 100 |
| Greenwood, Curltail Creek | 100 |
| Little Curltail Creek | 100 |
| Ridgeway, Hobby Lake | 100 |
| Rock Hill, Spring Ponds | 200 |
| Spartanburg, Moore's pond | 100 |
| Starr, Branch Pond | 100 |
| Westminster, Branch Lake | 100 |
| Woodruff, James Creek Pond | 100 |
| Yorkville, Hart's pond | 200 |
| McNeil's pond | 200 |
| Tennessee: | |
| Chattanooga, Chickamauga Creek | 200 |
| Concord, Pepper's pond | 200 |
| Gibson, Estes's pond | 100 |
| James's pond | 100 |
| McMinnville, Sink Creek | 400 |
| Murfreesboro, Stones River | 400 |
| Paris, Russell's lake | 100 |
| Sparta, Cave Spring Pond | 100 |
| Watauga Point, Buffalo Creek | 500 |
| Texas: | |
| Alpine, Jackson's pond | 100 |
| Anson, Hendrick's lake | 40 |
| Aquilla, Vaughan's lake | 75 |
| Blum, Mirror Lake | 50 |
| Bowie, Waggoner Pond | 50 |
| Celina, Gearhart's pond | 60 |
| Chico, Largent's lake | 40 |
| Comanche, Highland Lake | 150 |
| Cooledge, Hardeman's pond | 50 |
| Trinity and Brazos Valley Lake | 100 |
| Crawford, Railroad Lake | 100 |
| Cushing, Kinney's pond | 50 |
| Datura, Pritchard's pond | 50 |
| Dublin, Johnson's pond | 50 |
| Easterly, Easterly's pond | 75 |
| Edgewood, Brier Springs | 75 |
| Fairlie, Martingin Pond | 50 |
| Franklin, Cedar Creek, West Fork | 150 |
| Duncan's pond | 75 |
| Love's pond | 100 |
| Grapevine, Crowley's pond | 100 |
| Grapevine, Hicks's pond | 50 |
| Greenville, Birdsong Lake | 100 |
| Swan Pond | 40 |
| Haskell, Cunningham's pond | 100 |
| Shook's pond | 50 |
| Hico, Gilmore Creek | 50 |
| Joshua, Stephen's pond | 200 |
| Linden City, Dean's pond | 50 |
| Lufkin, Melville Delta Pond | 100 |
| Marfa, Barrel Springs Pond | 50 |
| Mineola, Conger's pond | 100 |
| Mount Vernon, Gardner's pond | 50 |
| Smith's pond | 75 |
| Palestine, Spring Lake | 100 |
| Park Springs, Plum Pond | 30 |
| Rotan, Lake Cottonwood | 100 |
| Tuxedo, Davis Lake | 25 |
| Waco, Fleming's pond | 75 |
| Winchell, Hoghland's pond | 150 |
| Winnsboro, Beggs's pond | 200 |
| Wolf City, Jones's pond | 50 |
| Utah: | |
| Lund, Bur Oak Spring Pond | 100 |
| Virginia: | |
| Bumpass, Hill's pond | 150 |
| Danville, McGuire's pond | 300 |
| Hewlett, Duke's pond | 200 |
| Hurt, Dawson's pond | 200 |
| Nace, Brugh's pond | 150 |
| Natural Bridge, Cedar Creek | 1,000 |
| Orange, Macon Spring | 100 |
| Salem, Roanoke River | 600 |
| Scottsville, Moon's pond | 600 |
| Totier Creek Pond | 600 |
| South Hill, Ferguson's pond | 200 |
| Spout Springs, Webbs Pond | 150 |
| Stuart, Mothers Home Pond | 200 |
| Tazewell, Wimmer's pond | 250 |
| Walkers Station, Vaidens Mill Pond | 600 |
| Winchester, Back Creek | 250 |
| Opequon River | 250 |
| Woods Cross Roads, Valley Front Pond | 150 |
| West Virginia: | |
| Bruceton Mills, Kelley's pond | 450 |
| Fairmont, Little Lakes | 650 |
| Fort Gay, Sweet Lake Pond | 200 |
| Wellsburg, Cross Creek | 500 |
| Wyoming: | |
| Sheridan, Cut Off Pond | 300 |
| Total [a] | 66,035 |

### WARMOUTH BASS.

| | |
|---|---|
| Georgia: | |
| Chamblee, Jones's pond | 40 |
| Maryland: | |
| Mountain Lock, Potomac River | 752 |
| Total | 792 |

[a] Lost in transit, 7,360 fingerlings.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SMALL-MOUTH BLACK BASS.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Arkansas: | | |
| Newport, Gamble Lake | | 2,000 |
| Watson Lake | | 2,000 |
| Warren, Eagle Creek | | 2,500 |
| Saline River | | 2,500 |
| Connecticut: | | |
| Wauregan, Moosup Pond | 1,500 | |
| Quinebaug River | 1,500 | |
| Illinois: | | |
| Anna, Fairground Lake | | 1,000 |
| Bloomington, Heafer Lake | | 150 |
| Momence, Kankakee River | | 500 |
| Naperville, DuPage River, West Branch | | 200 |
| Wilmington, Kanakee River | | 10,000 |
| Indiana: | | |
| Angola, Bass Lake | 1,000 | |
| Big Center Lake | 1,000 | |
| Buck Lake | 1,000 | |
| Clear Lake | 1,000 | |
| Elston Lake | 1,000 | |
| Failing Lake | 1,000 | |
| Fox Lake | 1,000 | |
| Hog Lake | 1,000 | |
| Lake James | 1,000 | |
| Lake Jimmerson | 1,000 | |
| Little Silver Lake | 1,000 | |
| Marsh Lake | 1,000 | |
| Middle Center Lake | 1,000 | |
| Pigeon Lake | 1,000 | |
| Silver Lake | 1,000 | |
| Snow Lake | 1,000 | |
| Batesville, Little Laughery Creek | | 180 |
| Bedford, Quarry Pool | | 500 |
| Bloomfield, Richland Creek | | 250 |
| Columbia City, Round Lake | | 300 |
| Corydon, Big Indian Creek | | 1,500 |
| Fort Wayne, Cedar Creek | | 1,000 |
| Dunton Lake | | 1,000 |
| Lake James | | 1,000 |
| Maumee River | | 1,000 |
| St. Joseph River | | 1,000 |
| St. Marys River | | 700 |
| Viberg Lake | | 1,000 |
| Georgetown, Big Indian Creek | | 2,000 |
| Goshen, Goshen Mill Pond | | 300 |
| Greencastle, Big Walnut River | | 1,000 |
| Deer Creek | | 1,000 |
| Little Walnut River | | 1,000 |
| Indianapolis, Eagle Creek | | 2,540 |
| Fall Creek | | 2,540 |
| School Creek Pond | | 300 |
| White River | | 3,240 |
| Lagrange, Royer River | | 225 |
| Laporte, Pine Lake | | 300 |
| Monticello, Monon River | | 315 |
| Tippecanoe River | | 375 |
| New Albany, Silver Creek | | 300 |
| Pendleton, Fall Creek | | 150 |
| Ray, Clear Lake | | 300 |
| Rome City, Sylvan Lake | | 375 |
| Shelbyville, Big Blue River | | 2,000 |
| Kentucky: | | |
| Cadiz, Caney Creek | | 2,000 |
| Little River | | 2,000 |
| Muddy Fork Creek | | 2,000 |
| East View, Nolin River | | 2,500 |
| Franklin, Sharps Creek | | 900 |
| Winchester, Goff's lake | | 1,500 |
| Maine: | | |
| Fryeburg, Kezar Pond | 1,600 | |
| Winthrop, Lake Annabessacook | 1,500 | |
| Lake Maranocook | 1,500 | |
| Maryland: | | |
| Cropley, Potomac River | 4,000 | |
| Hagerstown, Potomac River | 12,000 | |
| Mountain Lock, Potomac River | | 1,000 |

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Maryland—Continued. | | |
| Phoenix, Great Gunpowder River | 2,000 | |
| Pinesburg, Potomac River | 12,000 | |
| Turnpike, Red Run | 1,000 | |
| Massachusetts: | | |
| Congamond, Congamond Pond | 750 | |
| Halifax, Stetson Pond | 900 | |
| Kingston, Big Indian Pond | 900 | |
| Northampton, Highland House Lake | 750 | |
| Onset Junction, Flax Pond | 900 | |
| Webster, Peter Pond | | 300 |
| Webster Lake | | 300 |
| Woods Hole, Watcha Pond | 900 | |
| Michigan: | | |
| Alpena, Long Lake | 6,000 | |
| Au Sable, Cedar Lake | | 400 |
| Burr Oak, Hog Creek Lake | 3,000 | |
| Clare, Bass Lake | 1,500 | |
| Geroux Lake | 1,500 | |
| Lake Dewey | 1,500 | |
| Lily Lake | 1,500 | |
| South Lake | 1,500 | |
| Stevenson Lake | 1,500 | |
| West Lake | 1,500 | |
| Clarion, Walloon Lake | 10,000 | |
| Clyde, Fish Lake | 1,500 | 200 |
| Comins, Churchill Lake | | 400 |
| Dryden, Seven Ponds | 1,500 | |
| Youngs Lake | 1,500 | |
| East Tawas, Bass Lake | 3,000 | 1,000 |
| Empire, Glen Lake | | 400 |
| Lake Florence | | 400 |
| Evart, Garvison Pond | | 400 |
| Fowlerville, School Lot Lake | | 400 |
| Gaylord, Otsego Lake | | 1,000 |
| Gogebic, Gogebic Lake | | 300 |
| Harrisville, Cedar Lake | 3,000 | |
| Hubbard Lake | 3,000 | 400 |
| Hart, Round Lake | | 400 |
| Silver Lake | | 400 |
| Hastings, Clear Lake | 3,000 | |
| Leach Lake | 3,000 | |
| Long Lake | 3,000 | |
| Middle Lake | 3,000 | |
| Pine Lake | 3,000 | |
| Hillman, Valentine Lake | 3,000 | |
| Hillsdale, Baw Bees Lake | 3,000 | |
| Holly, Dickson Lake | 1,500 | |
| Fish Lake | 1,500 | |
| Ironwood, Beatons Lake | | 600 |
| Langsford Lake | | 800 |
| North Lake | | 400 |
| Rowe Lake | | 600 |
| Triplett Lake | | 400 |
| Wolf Lake | | 800 |
| Kingsley, Hogsback Lake | 2,000 | |
| Munsey Lake | 2,000 | |
| Rennie Lake | 2,000 | |
| Spider Lake | 2,000 | |
| Lake George, Lake George | 1,500 | |
| Shingle Lake | 1,500 | |
| La Rocque, Lake May | 3,000 | |
| Lewiston, Twin Lake | | 1,000 |
| Lincoln, McNally Lake | 3,000 | |
| Trask Lake | 3,000 | |
| Lupton, Sage Lake | | 400 |
| Mears, Silver Lake | | 400 |
| Middleville, Thornapple River | 3,000 | |
| Millersburg, Barnhart Lake | 3,000 | |
| Montague, Big Blue Lake | | 400 |
| Muskegon, Big Black Creek | | 400 |
| Newaygo, Sylvan Lake | | 400 |
| Oden, Crooked Lake | 5,000 | |
| Omena, Dougherty Lake | | 400 |
| Orchard Lake, Cooley Lake | 3,000 | |
| Long Lake | 3,000 | |
| Orion, Lake Orion | 3,000 | |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SMALL-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Michigan—Continued. | | |
| Pentecost, Sand Lake | 2,800 | |
| Pentwater, Pentwater Lake | | 400 |
| Rose Center, Mungers Lake | | 200 |
| North Buckhorn Lake | 1,500 | |
| South Buckhorn Lake | 1,500 | |
| St. James, Barney Lake | | 400 |
| Shelbyville, Gun Lake | 4,500 | |
| Topinabee, Mullet Lake | | 1,000 |
| Twin Lake, Wallace Lake | | 400 |
| Watersmeet, Bass Lake | | 300 |
| Crooked Lake | | 300 |
| Witch Lake, Long Lake | | 300 |
| New Hampshire: | | |
| Claremont, Rocky Bound Pond | 750 | |
| Peterboro, Cunningham Pond | 1,500 | |
| Pittsfield, Jenness Pond | 1,500 | |
| New Jersey: | | |
| Blackwood, Blackwood Lake | | 200 |
| Branchville, Culver Lake | | 200 |
| Lambertville, Lambertville Reservoir | | 100 |
| Sewell, Chestnut Branch | | 125 |
| Sunset Lake | | 125 |
| Sterling Forest, Greenwood Lake | | 150 |
| Sussex County, Lake Grinnell | | 100 |
| New York: | | |
| Auburn, Owasco Lake | | 500 |
| Batavia, Godfrey Pond | | 40 |
| Horseshoe Pond | | 40 |
| Tonawanda Creek | | 200 |
| Binghamton, Susquehanna River | | 40 |
| Broadalbin, Kennyette Creek | 5,000 | |
| Cambridge, Crystal Lake | 5,000 | |
| Dead Pond | 5,000 | |
| Lake Lauderdale | 5,000 | |
| School House Pond | 5,000 | |
| Fort Edward, Glen Lake | 5,000 | |
| Highland, Long Pond | 2,000 | |
| Johnstown, Caroga Lake | 5,000 | |
| East Caroga Lake | 5,000 | |
| Mud Lake | 5,000 | |
| Kingston, Mohonk Lake | 2,000 | |
| Mohonk Reservoir | 2,000 | |
| Middletown, Wallkill Creek | | 34 |
| Pelham, Hutchins Pond | | 150 |
| Schenectady, Mariaville Lake | 5,000 | |
| State Line, Queechy Lake | 2,000 | |
| Troy, Hudson River | | 400 |
| Water Mill, Howedona Lake | | 300 |
| West Point, Brooks Pond | 2,000 | |
| Yonkers, Grassy Sprain Lake | | 300 |
| North Carolina: | | |
| Hendersonville, Lake Wajaw | | 200 |
| Mortimer, Johns River | | 150 |
| Mulberry Creek | | 200 |
| Wilson Creek | | 150 |
| Ohio: | | |
| Columbus, Alum Creek | 1,500 | 200 |
| Black Lick Creek | 1,500 | |
| Deer Creek | 1,500 | |
| Hayden Run | 1,500 | |
| Little Darby Creek | 1,500 | |
| Olentangy River | 1,500 | 400 |
| Rocky Fork Creek | 1,500 | |
| Scioto River | 1,500 | |
| Dayton, Mad River | 3,000 | |
| Miami River | 3,000 | |
| Stillwater River | 3,000 | |
| Delphos, Auglaize River | 1,500 | |
| Germantown, Big Twin Creek | 3,000 | |
| Marietta, Muskingum River | | 400 |
| Newark, Raccoon Creek | | 600 |
| Pleasant Hill, Stillwater River | 1,500 | |
| Portsmouth, Millbrook Park Lake | | 400 |

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Ohio—Continued. | | |
| West Milton, Stillwater River | 1,500 | |
| Zanesville, Muskingum River | | 400 |
| Oklahoma: | | |
| Wyandotte, Sycamore Creek | | 200 |
| Pennsylvania: | | |
| Arcola, Perkiomen Creek | | 68 |
| Carbondale, Crystal Lake | | 40 |
| Newton Lake | | 40 |
| Water Company Dam | | 40 |
| Collegeville, Skippack Creek | | 50 |
| Greenville, Shenango River | | 40 |
| Harrisburg, Conedoguinet Creek | | 70 |
| Kratz, Perkiomen Creek | | 50 |
| Lebanon, Big Swatara Creek | | 70 |
| Farlings Creek | | 45 |
| Indian Town Creek | | 70 |
| Klines Dam | | 70 |
| Lake Conewago | | 70 |
| Little Swatara Creek | | 70 |
| Lowdermilk Dam | | 70 |
| Mish Mill Dam | | 70 |
| Mount Gretna Lake | | 70 |
| Raccoon Creek | | 45 |
| Stavers Mill Pond | | 70 |
| Stover Lake | | 70 |
| Weidman Dam | | 70 |
| Woomers Mill Pond | | 70 |
| Lenape, Brandywine Creek | | 68 |
| Oil City, Allegheny River | | 50 |
| Palm, Hosenack Lake | | 68 |
| Leiberts Dam | | 50 |
| Pottstown, Manatawany Creek | | 50 |
| Scranton, Cobbs Pond | | 50 |
| Moosic Lake | | 50 |
| Susquehanna, Butler Lake | | 40 |
| Comfort Lake | | 40 |
| Susquehanna River | | 40 |
| Troy, Sugar Creek | | 40 |
| West Chester, Sharples' lake | | 50 |
| Wheelerville, Elk Lake | | 40 |
| Rhode Island: | | |
| Kingston, Long Pond | 1,500 | |
| Tucker Pond | 1,500 | |
| White Pond | 1,400 | |
| Tennessee: | | |
| Denver, Trace Creek | | 6,000 |
| McEwen, Hurricane Creek | | 3,000 |
| Waverly, Hurricane Creek | | 7,000 |
| Vermont: | | |
| Barnet, Martins Pond | 6,000 | |
| Wardens Pond | 6,000 | |
| Concord, Halls Pond | 4,000 | |
| Danville, Keeser Pond | 5,000 | |
| Groton, Lake Groton | 6,000 | |
| Lunds Pond | 6,000 | |
| Lyndonville, Bean Pond | 5,000 | |
| Institute Pond | 10,000 | |
| Miles Pond, Miles Pond | 4,000 | |
| North Troy, Upper Missisquoi River | | 300 |
| Passumpsic, Passumpsic River | 750 | |
| Poultney, Lake St. Catherine | 5,000 | |
| Rutland, Lake Bomoseen | 10,000 | |
| West Danville, Joe's pond | 5,000 | |
| Wolcott, Wolcott Pond | 5,000 | |
| Virginia: | | |
| Ashby, Shenandoah River | | 350 |
| Covington, Potts Creek | | 200 |
| Danville, Clarks Pond | 3,000 | |
| McGuires Ponds | 8,000 | |
| Drewrys Bluff, Falling Creek | 9,000 | |
| Loudoun County, Potomac River | 24,000 | |
| Millboro, Cow Pasture River | 12,000 | |
| Nathalie, Brown Pond | 3,000 | |
| Orange, Sharon Lake | 1,000 | |
| Petersburg, Club Pond | 3,000 | |

## Details of Distribution of Fish and Fish Eggs—Continued.

### SMALL-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Virginia—Continued. | | |
| Petersburg, Woody Pond | 6,000 | |
| Providence Forge, Mirror Lake | 12,000 | |
| Relee, Relee Lake | 1,000 | |
| Remington, Rappahannock River | 2,000 | |
| Richmond, Falling Creek Pond | 3,000 | |
| Rockfish, Rockfish Pond | 1,000 | |
| Rockfish River | 2,000 | |
| Warrenton, Cedar Run | | 300 |
| Washington: | | |
| Bellingham, Lake Wildwood | | 100 |
| Loon Lake, Loon Lake | | 100 |
| Spokane, Liberty Lake | | 100 |
| Tacoma, American Lake | | 100 |
| West Virginia: | | |
| Capon Springs, Great Cacapon River | 45,000 | |
| Harpers Ferry, Potomac River | | 1,200 |
| Renick, Cuberson Creek | 9,000 | |
| Greenbrier River | 24,000 | |
| West Virginia—Continued. | | |
| Roncevert, Greenbrier River | | 800 |
| Sistersville, Middle Island Creek | | 100 |
| Springfield, Potomac River, South Branch | 15,000 | |
| Wisconsin: | | |
| Armstrong Creek, Lake Gordon | | 300 |
| Lake Hilbert | | 300 |
| Cisco, Lake Tenderfoot | | 300 |
| Harshaw, Hancock Lake | | 300 |
| Hayward, Round Lake | | 800 |
| Hurley, Bear Lake | | 400 |
| Okauchee, Okauchee Lake | | 498 |
| Princeton, Fox River | | 300 |
| Sobieski, Bass Lake | | 300 |
| Soperton, Otter Lake | | 300 |
| Spider, Spider Lake | | 500 |
| State Line, Little Bass Lake | | 300 |
| Total[a] | 537,400 | 109,986 |

### LARGE-MOUTH BLACK BASS.

| | | |
|---|---|---|
| Alabama: | | |
| Montgomery, Brick Yard Lake | | 1,000 |
| Whetstone Lake | | 2,000 |
| Seale, Evans's pond | | 2,000 |
| Arizona: | | |
| Flagstaff, Lake Mary | | 300 |
| Tucson, Cienga Creek | | 300 |
| Arkansas: | | |
| Bearden, Crystal Lake | | 150 |
| Bentonville, Sugar Creek | | 500 |
| England, Clear Lake | | 400 |
| Fairfield, Atkins Lake | | 350 |
| Helena, Blue Hole | | 1,000 |
| Long Lake | | 1,800 |
| Mississippi River | | 7,323 |
| Hope, Moses's lake | | 100 |
| Sandy Bois d'Arc River | | 250 |
| Lake Village, Lake Chicot | | 1,150 |
| Lancaster, Frog Bayou | | 500 |
| Little Rock, Asylum Pond | | 100 |
| Mammoth Spring, Strawberry Creek | | 500 |
| Warm Fork | | 300 |
| Mena, Big Brushy Creek | | 300 |
| Big Fork Creek | | 350 |
| Carter Creek | | 300 |
| Clear Creek | | 350 |
| Cossatot River | | 300 |
| Dallas Creek | | 300 |
| Irons Fork River | | 300 |
| Jansen Lake | | 300 |
| Little Brushy Creek | | 300 |
| Little Missouri River | | 350 |
| Little Rock Creek | | 300 |
| Mountain Fork River | | 300 |
| Ouachita River | | 600 |
| Prairie Creek | | 300 |
| Two Mile Creek | | 300 |
| Paris, College Lake | | 500 |
| Rosboro, Caddo Pond | | 100 |
| Scott, Old River | | 540 |
| Thornton, Pine Lake | | 125 |
| Upland, Brazeal's pond | | 30 |
| Colorado: | | |
| Boulder, Pitts' pond | | 150 |
| Denver, Holliday's lakes | | 150 |
| La Jara, Laguna Escondida | | 480 |
| La Junta, Holbrook Reservoir | | 1,000 |
| Lamar, King Lake | | 320 |
| Neegrando Lake | | 320 |
| Colorado—Continued. | | |
| Lamar, Neenoshe Lake | | 320 |
| Neeskah Lake | | 320 |
| Neesopah Lake | | 320 |
| Parrish's lake | | 320 |
| Thurston Lake | | 320 |
| Thurston Reservoir | | 320 |
| Littleton, Springer's pond | | 300 |
| Manzanola, Lewis' reservoir | | 450 |
| Pueblo, Squirrel Creek Reservoir | | 100 |
| Rifle, Bear River | | 150 |
| Grand River | | 300 |
| Connecticut: | | |
| Coscob, Pipestave Lake | | 250 |
| Danbury, Bradley's pond | | 225 |
| Weekapeeka Lake | | 300 |
| East Hampton, Pocotopaug Lake | | 400 |
| Goodspeeds, Bashan Lake | | 390 |
| Higganum, Higganum Reservoir | | 300 |
| New Canaan, Lake Waccobuc | | 200 |
| North Stonington, Wyassup Lake | | 390 |
| Waterbury, White Oak Pond | | 260 |
| Weathersfield, Goff Pond | | 250 |
| Delaware: | | |
| Milton, Parkers Pond | | 300 |
| Parker Run | | 100 |
| Teall Mill Pond | | 200 |
| District of Columbia: | | |
| Washington, Central Station Aquarium | | 150 |
| Florida: | | |
| Ehren, Muller's pond | | 500 |
| Lake Como, Lake Como | | 500 |
| Ocala, Fry Lake | | 2,000 |
| Orlando, Smith's lake | | 500 |
| Sanford, Lake Bertha | | 500 |
| Santos, Lake Madonna | | 500 |
| Sorrento, Lake Lucy | | 1,000 |
| Georgia: | | |
| Douglas, Peterson's ponds | | 1,750 |
| Greenville, Powers Hill Pond | | 1,500 |
| Groveland, Cannochee River | | 1,000 |
| Lake Park, Long Pond | | 1,000 |
| Ocean Pond | | 500 |
| Marietta, McKenzie's pond | | 500 |
| Mayfield, Cason's pond | | 100 |

[a] Lost in transit, 3,319 fingerlings.

## Details of Distribution of Fish and Fish Eggs—Continued.

### LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Georgia—Continued. | | |
| Millen, Buck Head Creek | | 1,000 |
| Ogeechee River | | 1,000 |
| Oglethorpe, Buck Creek | | 750 |
| Talbotton, Williams Pond | | 250 |
| Tifton, Hale's pond | | 500 |
| Valdosta, Loch Laurel | | 500 |
| Vienna, Heard's pond | | 250 |
| Idaho: | | |
| Nampa, Lake Lowell | | 250 |
| Priest River, Lees Pond | | 100 |
| Illinois: | | |
| Antioch, Lake Marie | | 1,200 |
| Aurora, Fox River | | 900 |
| Belleville, Biebel's pond | | 250 |
| Fourmile Club Lakes | | 200 |
| Beech Ridge, Cache River | | 550 |
| Brighton, Kelsey's pond | | 300 |
| Montgomery Lake | | 250 |
| Cairo, Cache River | | 550 |
| Campus, Factory Pond | | 500 |
| Carbondale, Cox's lake | | 200 |
| Manning Pond | | 800 |
| Mine Pond | | 800 |
| Spillers Lake | | 300 |
| Thompsons Lake | | 400 |
| Carter, Wellman's lake | | 300 |
| Carterville, Brandon Pond | | 100 |
| Carroll's pond | | 300 |
| Carter Pond | | 150 |
| Coleman Pond | | 175 |
| Colp and Arnold Lakes | | 150 |
| Ferrell Pond | | 150 |
| Hofer Lake | | 100 |
| Zimmerman's lake | | 350 |
| Chester, Crisler's pond | | 350 |
| Fishing Club Lake | | 300 |
| Clay City, Doherty's pond | | 100 |
| Crainville, Norton's pond | | 100 |
| Crystal Lake, Crystal Lake | | 800 |
| Dallas City, Mississippi River | | 900 |
| Decatur, Club Lake | | 80 |
| Franklin, Burlington Reservoir | | 300 |
| Freeburg, Freeburg Lake | | 200 |
| Walnut Grove Pond | | 500 |
| Glenwood, Glenwood Pond | | 1,000 |
| Grays Lake, Gages Lake | | 1,000 |
| Herrin, Cambon Pond | | 300 |
| Egyptian Pond | | 450 |
| Homewood, Calumet River | | 500 |
| Kankakee, Iroquois River | | 1,200 |
| Kankakee River | | 1,200 |
| Kansas, Hallock's lake | | 200 |
| Kewanee, Sans Souci Lake | | 750 |
| Makanda, Roberts's pond | | 100 |
| Marion, Hart's pond | | 175 |
| Keystone Pond | | 150 |
| Schwerdt's lake | | 400 |
| Water Works Lake | | 150 |
| Modoc, Bersche's pond | | 200 |
| Mulberry Grove, Hudson Pond | | 300 |
| Murphysboro, Stacher Lake | | 200 |
| Naperville, Du Page River, East Branch | | 1,000 |
| Stone Quarry Lake | | 450 |
| O'Fallon, Henrys Lake | | 400 |
| Olney, Olney City Reservoir | | 400 |
| Richmond, Lake Elizabeth | | 800 |
| Riverside, Des Plaines River | | 900 |
| Sandusky, Round Pond | | 100 |
| Shepherd, Sni E'Carte River | | 600 |
| Sterling, Sinsippi Lake | | 900 |
| Ullin, Cache River | | 550 |
| Utica, Fourth Quarry Pond | | 450 |
| Vandalia, Kaskaskia River | | 500 |
| Virden, Maple Avenue Lake | | 300 |
| Waterloo, Bissell Lake | | 600 |
| Woodberry, Woodberry Lake | | 500 |
| Indiana: | | |
| Anderson, Bayview Pond | | 400 |
| West Brook Pond | | 300 |
| Claypool, Caldwell Lake | | 250 |
| Simon Shultz Lake | | 200 |
| Yellow Creek Lake | | 250 |
| Corydon, Big Indian Creek | | 300 |
| Elbert's lake | | 100 |
| DeLong, Tippecanoe River | | 700 |
| Eaton, Hamilton's pond | | 125 |
| Fort Wayne, Lake Emily | | 300 |
| Indianapolis, Eagle Creek | | 100 |
| Fall Creek | | 200 |
| Nesom's pond | | 75 |
| White River | | 200 |
| Jasper, Calumet Lake | | 300 |
| Schmitt's pond | | 100 |
| Kendallville, Bixler Lake | | 200 |
| Liberty, White Water River, East Fork | | 375 |
| Macy, North Mud Lake | | 400 |
| South Mud Lake | | 400 |
| Monticello, Big Metamonong Creek | | 300 |
| Tippecanoe River | | 300 |
| New Albany, Silver Lake | | 40 |
| North Liberty, Rupel Lake | | 300 |
| Owensville, Stone's pond | | 100 |
| Paoli, Brookside Reservoir | | 100 |
| Pierceton, Webster Lake | | 200 |
| Richmond, Rettig Lake | | 50 |
| Rockville, Little Raccoon Creek | | 435 |
| Rome City, Lower Lake | | 400 |
| Sylvan Lake | | 800 |
| Stewartsville, Footes Lake | | 200 |
| Summitville, Roseboom's pond | | 200 |
| Warren, Salamonie River | | 400 |
| Iowa: | | |
| Bentley, Walnut Hill Pond | | 125 |
| Cedar Falls, Cedar River | | 400 |
| Hacketts Lake | | 400 |
| Chariton, McCoy's pond | | 100 |
| Rice Lake | | 600 |
| Charles City, Cedar River | | 400 |
| Chester, Upper Iowa River | | 800 |
| Clarion, Elm Lake | | 400 |
| Coggon, Buffalo Creek | | 400 |
| Corning, Lake Vernon | | 100 |
| Decorah, Upper Iowa River | | 400 |
| DeWitt, Crystal Lake | | 400 |
| Silver Creek | | 200 |
| Edgewood, Funk's pond | | 150 |
| Forest City, Imogene Lake | | 150 |
| Glenwood, Glenwood Park Lake | | 700 |
| Hampton, Reed Lake | | 400 |
| Independence, Wapsipinicon River | | 400 |
| Lime Springs, Upper Iowa River | | 2,250 |
| Manchester, Maquoketa River | | 7,100 |
| Marble Rock, Shell Rock River | | 400 |
| Maynard, Little Volga Creek | | 300 |
| North McGregor, Mississippi River | | 5,250 |
| Tuskeego, Robertson's pond | | 100 |
| Kansas: | | |
| Belmont, Bentley's pond | | 100 |
| Blue Rapids, Big and Little Blue River | | 300 |
| Bronson, Second Lake | | 100 |
| Caldwell, Fall Creek | | 500 |
| Chanute, Valley View Pond | | 100 |
| Cherryvale, City Lake | | 300 |
| Colony, Clark's pond | | 125 |
| Conway Springs, Slate Creek | | 300 |
| Farlington, Mitchell's pond | | 125 |
| Huron, Anthony's pond | | 225 |
| Isabel, Gibson's pond | | 100 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Kansas—Continued. | | |
| Kansas City, Idlewild Lake | | 100 |
| Kingman, Harris Springs Pond | | 200 |
| Reed's pond | | 100 |
| Leavenworth, Fairgrounds Lake | | 150 |
| Marion, Catlin Creek | | 250 |
| Clear Creek | | 250 |
| Cottonwood River, South Fork | | 250 |
| Middle Creek | | 250 |
| Mud Creek | | 250 |
| Willowbrook Pond | | 100 |
| Medicine Lodge, Chapin Ponds | | 125 |
| Currie Lake | | 125 |
| Read Lake | | 250 |
| Silver Springs Lake | | 250 |
| Melvern, Long Creek | | 250 |
| Peabody, Cotton Creek | | 100 |
| Country Club Lake | | 250 |
| Crisfield Pond | | 250 |
| Doyle Creek | | 350 |
| Gray's pond | | 250 |
| Henry Creek | | 250 |
| Johnson's pond | | 100 |
| Rock Island Lake | | 250 |
| Spring Creek | | 350 |
| Townsend's pond | | 250 |
| Pittsburg, Sporting Club Ponds | | 125 |
| St. Francis, Spring Creek | | 75 |
| Selden, Prairie Dog Creek | | 325 |
| Tyro, Brick Company's lake | | 150 |
| Waverly, Rock Creek | | 200 |
| Wilder, Woodson's pond | | 100 |
| Yates Center, Waterworks Reservoir | | 250 |
| Kentucky: | | |
| Anchorage, Cox Lake | | 150 |
| Pryor's pond | | 75 |
| Augusta, Licking River, North Fork | | 80 |
| Bonnieville, Riggs's pond | | 75 |
| Campbellsburg, Little Kentucky River | | 200 |
| Ekron, Horse Lot Pond | | 100 |
| Woods Pond | | 100 |
| Yellow Lake | | 100 |
| Elizabethtown, Cedar Creek | | 80 |
| Nolin River | | 80 |
| Rauboldt Pond | | 40 |
| Valley Creek | | 80 |
| Youngers Creek | | 80 |
| Eminence, Thorne's pond | | 75 |
| Glasgow, Beard Pond | | 75 |
| Boyds Creek | | 200 |
| Fallen Timber Creek | | 200 |
| Peters Creek | | 150 |
| Richardson Pond | | 100 |
| Skeggs Creek | | 200 |
| South Fork Creek | | 75 |
| Glendale, Nolin Creek | | 150 |
| Hodgensville, Nolin Creek | | 80 |
| La Grange, Highland Lake | | 150 |
| Lebanon, Big Pond | | 75 |
| Cheyels Creek | | 75 |
| Indian Creek | | 75 |
| Peeps Creek | | 150 |
| Rolling Fork Creek | | 150 |
| Rolling Fork Creek, North Branch | | 150 |
| Rolling Fork Creek, South Branch | | 150 |
| Louisville, Green's pond | | 80 |
| Lake Lansdowne | | 195 |
| Parkview Club Lake | | 80 |
| South Park Lake | | 160 |
| Wagner's pond | | 80 |
| Kentucky—Continued. | | |
| Stephensburg, Blue Lake | | 200 |
| Stephensburg Lake | | 200 |
| Williamsburg, Jellico Creek | | 300 |
| Louisiana: | | |
| Athens, Dullon Pond | | 100 |
| Benton, Sunnyside Pond | | 100 |
| Bogalusa, Bogalusa Pond | | 250 |
| Bowie, Hill Pond | | 50 |
| Broussard, Hazard Pond | | 25 |
| Clinton, Gallent's pond | | 100 |
| Edgerly, Chesson's pond | | 50 |
| Jeanerette, Albania Pond | | 75 |
| Lake Charles, Brickyard Pond | | 25 |
| Laurel Hill, Rose Mound Lake | | 150 |
| Lillie, Pin Oak Pond | | 30 |
| Marthaville, Huff's pond | | 100 |
| Rustin, Lyles's pond | | 125 |
| Maine: | | |
| Boothbay Harbor, Pine Lake | | 450 |
| Redfield, Parker Pond | | 155 |
| Maryland: | | |
| Abell's Wharf, Forbes Pond | | 150 |
| Alesia, Big Gunpowder River | | 320 |
| Gunpowder Falls | | 180 |
| Baltimore, Severn River | | 280 |
| Brunswick, Potomac River | | 130 |
| Cumberland, Potomac River | | 160 |
| Wills Creek | | 80 |
| Easton, Peach Blossom Creek | | 150 |
| Freeland, Rock Dale Ponds | | 280 |
| Gwynnbrook, Gwynn Brook | | 100 |
| Hagerstown, Antietam Creek | | 150 |
| Conococheague Creek | | 200 |
| Potomac River | | 400 |
| Hampstead, Patapsco River, North Branch | | 340 |
| Hoods Mill, Patapsco River | | 270 |
| Lambson, Sassafras River | | 300 |
| Massey, Swan Branch | | 150 |
| Mountain Lock, Potomac River | | 440 |
| Phoenix, Gunpowder River | | 140 |
| Riverdale, Anacostia River | | 100 |
| Rocky Ridge, Monocacy River | | 300 |
| Salisbury, Wicomico River | | 200 |
| Taneytown, Goulden's pond | | 80 |
| Woodstock, Patapsco River | | 360 |
| Massachusetts: | | |
| East Dedham, Mather Brook Pond | | 250 |
| Fall River, Laurel Lake | | 390 |
| Falmouth, Morse Pond | | 250 |
| Greenfield, Deerfield River | | 1,560 |
| Wareham, Big Sandy Pond | | 400 |
| Little Sandy Pond | | 400 |
| West Gloucester, Haskell's pond | | 390 |
| Michigan: | | |
| Alpena, Grand Lake | | 350 |
| Crystal Falls, Fortune Lake | | 200 |
| Lake Mary | | 200 |
| Mud Lake | | 200 |
| Edwardsburg, Morn Creek | | 350 |
| Greenville, Flat River | | 1,000 |
| Tufk Lake | | 200 |
| Hanover, Crispell Lake | | 150 |
| Farewell Lake | | 150 |
| Fox Lake | | 100 |
| Hart, Juniper Pond | | 175 |
| Ironwood, Long Lake | | 400 |
| Mosquito Lake | | 400 |
| North Lake | | 200 |
| Pomeroy Lake | | 400 |
| Round Lake | | 200 |
| Silver Lake | | 400 |
| Sutherland Lake | | 400 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Michigan—Continued. | | |
| Ironwood, Tamarack Lake | | 400 |
| Taylor Lake | | 400 |
| Ishpeming, Silver Lake | | 400 |
| Kingsley, Hogsback Lake | | 375 |
| Rennie Lake | | 375 |
| Oakley, Shiawassee River | | 200 |
| Oden, Crooked Lake | | 700 |
| Schoolcraft, Weed Lake | | 175 |
| Sylvania, Katherine Lake | | 200 |
| West Bear Lake | | 200 |
| Turtle, African Lake | | 400 |
| Clover Leaf Lake | | 200 |
| Eel Lake | | 200 |
| Emiline Lake | | 200 |
| Gaylord Lake | | 200 |
| Hawk Lake | | 400 |
| Honey Moon Lake | | 400 |
| Independence Lake | | 400 |
| Line Lake | | 400 |
| Mint Lake | | 200 |
| Moose Lake | | 400 |
| Orms Lake | | 400 |
| Rowes Lake | | 400 |
| Toe Lake | | 200 |
| Minnesota: | | |
| Alexandria, Darling Lake | | 200 |
| Lake Agnes | | 150 |
| Lake Carlos | | 700 |
| L'Hommedieu Lake | | 300 |
| Brownsville, Mississippi River | | 3,000 |
| Duluth, White Lake | | 400 |
| Kelsey, Lake Rauppe | | 450 |
| Mankato, Lake Washington | | 400 |
| Minneapolis, Burnett's lake | | 300 |
| Pengilly, Swan Lake | | 900 |
| Preston, Root River | | 600 |
| Root River, Middle Branch | | 600 |
| Rochester, Zumbro River, Middle Branch | | 200 |
| Zumbro River, South Branch | | 200 |
| St. Paul, State Fish Commission | | 18,250 |
| South Haven, Augusta Lake | | 400 |
| Betsy Lake | | 400 |
| Lake Caroline | | 400 |
| Stewartsville, Lake Florence | | 500 |
| Root River | | 600 |
| Mississippi: | | |
| Aberdeen, Dead Lake | | 25 |
| McNiece Lake | | 300 |
| Medor Lake | | 600 |
| Tombigbee River | | 275 |
| Ackerman, Willow Pond | | 200 |
| Agricultural College, McKell's pond | | 100 |
| Bexley, Leatherberry Mill Pond | | 75 |
| Mill Pond | | 75 |
| Biloxi, Howell Pond | | 75 |
| Lorenzo Pond | | 75 |
| Brandon, Raymond Pond | | 100 |
| Canton, Factory Pond | | 100 |
| McBride Pond | | 100 |
| Round Lake | | 100 |
| Columbus, Lake Katherine | | 300 |
| Corinth, Bridge Creek | | 200 |
| Cane Creek | | 300 |
| Chambers Creek | | 300 |
| Clear Creek | | 200 |
| Clear Lake | | 150 |
| Conway Lake | | 200 |
| Coon Creek Pond | | 200 |
| Derryberry Lake | | 100 |
| Elams Creek | | 150 |
| Griffins Pond | | 150 |
| Gum Pond | | 200 |
| Mississippi—Continued. | | |
| Corinth, Lambert's lake | | 150 |
| Long Pond | | 150 |
| Marlows Mill Pond | | 100 |
| Parmitchie Creek | | 200 |
| Romine and Ward Pond | | 150 |
| Santa Fe Lake | | 150 |
| Seven Mile Creek | | 200 |
| Tuscumbia River | | 300 |
| Utley Mill Pond | | 150 |
| Waukomis Lake | | 300 |
| Wilson's pond | | 100 |
| Dancy, Barefoot's pond | | 100 |
| McCarter's pond | | 150 |
| Smith's pond | | 150 |
| Walker's pond | | 100 |
| White's pond | | 150 |
| Wilson's pond | | 100 |
| Durant, Smith's pond | | 200 |
| Friars Point, Moon Lake | | 250 |
| Houlka, Reed's pond | | 25 |
| Houston, Busby's pond | | 150 |
| Knox Pond | | 50 |
| Howells Switch, Rankin Pond | | 400 |
| Jackson, Curry's pond | | 300 |
| Farish Pond | | 150 |
| Lewis's pond | | 100 |
| Lynch's pond | | 150 |
| Morrison's pond | | 150 |
| Richmond Lake | | 300 |
| Spring Lake | | 300 |
| Tapley's pond | | 150 |
| Lee County, King Creek | | 650 |
| McCool, Fancher's pond | | 300 |
| Lily Pond | | 150 |
| Sweet Gum Lake | | 150 |
| McDonald, Majure's pond | | 25 |
| Ogletree's pond | | 25 |
| Smith's pond | | 25 |
| Maben, Butler's pond | | 150 |
| Macon, Eiland Pond | | 150 |
| Howards Lake | | 200 |
| Madison Station, Glenarchen Pond | | 100 |
| Mantee, Lofton's pond | | 150 |
| Moseley Pond | | 200 |
| Taylor's pond | | 150 |
| Meridian, College Lakes | | 300 |
| Pleasant Springs | | 45 |
| Queen City Club Pond | | 200 |
| New Albany, Conner's pond | | 200 |
| New Houlka, Chuquatonchee Creek | | 150 |
| DeLashmet Lake | | 150 |
| Houlka Creek | | 300 |
| Reed Pond | | 200 |
| Okolona, Elliott Pond | | 200 |
| Mill Pond | | 200 |
| Okolona Lake | | 200 |
| Red Bud Creek | | 150 |
| Sansom's lakes | | 600 |
| Osborn, Montgomery's pond | | 100 |
| Oak Grove Pond | | 100 |
| Pearson, Sweetwater Lake | | 200 |
| Philadelphia, Wilson's pond | | 50 |
| Pickayune, Tate's lake | | 75 |
| Ripley, Morgan's pond | | 25 |
| Sallis, Temple's pond | | 200 |
| Sessums, Ash Creek Pond | | 100 |
| Gay's pond | | 100 |
| Rush's pond | | 100 |
| Wild's pond | | 100 |
| Shuqualak, Belle Pond | | 200 |
| Dugan Pond | | 100 |
| Hamilton's pond | | 100 |
| Jenkins' pond | | 70 |
| Woodlawn Pond | | 200 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Mississippi—Continued. | | |
| Starkville, Harmon Lake | | 200 |
| Johnson's pond | | 100 |
| McPherson Lake | | 100 |
| Reynolds Lake | | 100 |
| Richey's pond | | 100 |
| Wade's pond | | 150 |
| Washington's pond | | 100 |
| Strongs, Cox Branch | | 100 |
| Lake Artecore | | 100 |
| Tofulla Creek | | 200 |
| Sturgis, Hutchinson Pond | | 100 |
| Summit, Godbold's lake | | 250 |
| Toomsuba, Live Oak Lake | | 35 |
| Tupelo, Mill Pond | | 100 |
| Park Lake | | 300 |
| Wiygul's lake | | 150 |
| Union, Johnson's pond | | 25 |
| West Point, Evans Pond | | 150 |
| Tibbee Lake | | 300 |
| Tipton's pond | | 150 |
| Yazoo City Cedar Grove Pond | | 150 |
| Missouri: | | |
| Asbury, Blackberry Creek | | 200 |
| Aurora, Flat Creek | | 300 |
| Bolivar, Pomme de Terre River | | 400 |
| Brandsville, Lake of the Four Cantons | | 100 |
| Butler, Lake Katherine | | 400 |
| Cabool, Piney River | | 200 |
| Clever, Bailey's lake | | 200 |
| Estes's pond | | 400 |
| Clinton, Clinton Lake | | 300 |
| Cole Camp, Cole Camp Creek | | 300 |
| Corkney, Niangua River | | 150 |
| Creve Cœur, Creve Cœur Lake | | 225 |
| Dedwick, Livingston's pond | | 100 |
| Deepwater, Dickey Lake | | 150 |
| Fredericktown, St. Francis River | | 200 |
| Grand View, Spring Lake | | 100 |
| Higginsville, Railroad Pond | | 475 |
| Kansas City, Fairmount Lake | | 400 |
| Koshkonong, Lake Rowland | | 100 |
| Knoblick, Little St. Francis Creek | | 140 |
| Langdon, Langdon Lake | | 300 |
| Maysville, Dieter's lake | | 150 |
| Mexico, Railroad Lake | | 200 |
| Water Works Reservoir | | 200 |
| Mount Vernon, Truitt Creek | | 300 |
| Neosho, Crescent Pond | | 200 |
| Nevada, Railroad Reservoir | | 200 |
| Noel, Perry's ponds | | 200 |
| Pleasant Hill, Leonards Lake | | 500 |
| Richards, Richardson's pond | | 100 |
| Rolla, Big Beaver Creek | | 80 |
| Big Dry Fork Creek | | 150 |
| Little Beaver Creek | | 100 |
| Little Dry Fork Creek | | 100 |
| Love Creek | | 100 |
| McBride Spring Branch | | 40 |
| Waltz Spring Branch | | 40 |
| Rosedale, Lewis's pond | | 40 |
| Springfield, Doling Lake | | 300 |
| Swope Station, Lagoon Lake | | 200 |
| Wooded Lake | | 200 |
| Thayer, Warm Fork Creek | | 200 |
| Wayne, Woodruff Springs | | 300 |
| Waynesville, Gasconade River | | 150 |
| West Plains, Woolworth's bayou | | 200 |
| White River, North Fork | | 200 |
| Willow Springs, Willow Springs Reservoir | | 200 |
| Nebraska: | | |
| Stuart, Clear Lake | | 200 |
| Nevada: | | |
| Ely, Argus Lake | | 250 |
| Cleveland Lake | | 250 |
| New Jersey: | | |
| Ashland, Newtown Lake | | 300 |
| Boonton, Deckers Pond | | 400 |
| Collingswood, Newton Lake | | 600 |
| Denville, Sanitarium Lake | | 300 |
| Dover, Longwood Lake | | 500 |
| Shongum Lake | | 400 |
| Lakewood, Lanes Mill Pond | | 200 |
| Lambertville, Lower Reservoir | | 250 |
| Mullica Hill, Mullica Hill Pond | | 400 |
| Netcong, Bear Pond | | 200 |
| Ogdensburg, Hawthorne Lake | | 400 |
| Paterson, Squaw Lake | | 400 |
| Pennsgrove, Du Pont Pond | | 100 |
| Layton Pond | | 350 |
| Pompton Lakes, Pompton Lakes | | 800 |
| Princeton Junction, Carnegie Lake | | 500 |
| Rahway, Water Company's reservoir | | 500 |
| Riverside, Beck's pond | | 250 |
| Sicklerville, Brooklyn Lake | | 600 |
| Sewell, Bethel Lake | | 300 |
| South Vineland, Buckshietem Mill Pond | | 400 |
| Waterloo, Jefferson Lake | | 200 |
| Wenonah, Pyle's lake | | 250 |
| Westwood, Musquapsink Lake | | 400 |
| New Mexico: | | |
| Artesia, Clark's lake | | 250 |
| Carlsbad, Pecos River | | 500 |
| Rocky Arroyo Creek | | 150 |
| Colfax, Adams Lake | | 254 |
| Dexter, Bishop's lake | | 150 |
| Gallup, Ramah Reservoir | | 300 |
| Hagerman, Ware's reservoir | | 150 |
| Las Vegas, Buena Vista Lake | | 280 |
| Santa Fe, Miller's pond | | 100 |
| Springer, Farmers Reservoir | | 320 |
| Jaritas Lake | | 320 |
| Wagon Mound, Santa Clara Creek Reservoir | | 195 |
| New York: | | |
| Arcade, Crystal Lake | | 400 |
| Cambridge, Second Pond | | 400 |
| Craryville, Copake Lake | | 400 |
| Dover Plains, Lake Ellis | | 400 |
| East Worcester, Hudson Lake | | 400 |
| Gloversville, Mountain Lake | | 400 |
| Greatkills, Shore Acres Pond | | 150 |
| Greene, Chenango River | | 400 |
| Greenport, Sills Pond | | 100 |
| Highland Falls, Roe Park Lake | | 200 |
| Hudson, Hasbrouck Pond | | 400 |
| Huntington, Koster's pond | | 100 |
| Johnstown, Canada Lakes | | 400 |
| Lockport, Red Creek | | 300 |
| Middletown, Wallkill River | | 300 |
| Monticello, Anawana Lake | | 200 |
| Brown Pond | | 200 |
| Highland Lake | | 200 |
| Kiamesha Lake | | 200 |
| Metock Pond | | 200 |
| Sacket Lake | | 200 |
| Sand Pond | | 200 |
| White Lake | | 200 |
| Narrowsburg, Half Moon Lake | | 400 |
| Nunda, Genesee River | | 400 |
| Raquette Lake, Blue Mountain Lake | | 400 |
| Eagle Lake | | 400 |
| Utawana Lake | | 400 |
| Riverside, Big Pond | | 500 |
| Bullett Pond | | 500 |
| Paradox Lake | | 500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| New York—Continued. | | |
| Riverside, Schroon Lake | | 500 |
| Roscoe, Florence Lake | | 400 |
| Thurman, Echo Lake | | 400 |
| Ticonderoga, Eagle Lake | | 400 |
| Walden, Wallkill River | | 300 |
| Wallkill, Schawangunk River | | 400 |
| Warwick, Wickham Lake | | 400 |
| Williamstown, Panther Lake | | 400 |
| North Carolina: | | |
| Charlotte, Catawba River, North Fork | | 96 |
| Franklin, Cartoogaja Creek | | 405 |
| Cullasagee Creek | | 405 |
| Tennessee River | | 300 |
| North Dakota: | | |
| Ambrose, Skjerno Lake | | 300 |
| Annamoose, Round Lake | | 400 |
| Berlin, Cottonwood Creek | | 400 |
| Cottonwood Pond | | 100 |
| Bottineau, Lake Dana | | 300 |
| Lake McArthur | | 300 |
| Burnstad, Beaver Lake | | 400 |
| Buttzville, Buttz's pond | | 300 |
| Cathay, Rocky Run Lake | | 300 |
| Cayuga, Anderson's lake | | 100 |
| Crystal Springs, Crystal Springs Lake | | 500 |
| Dawson, Lake Isabel | | 400 |
| Devils Lake, Devils Lake | | 3,500 |
| Elliott, Lake Elliott | | 200 |
| Glen Ullin, Antelope Creek | | 100 |
| Burns Pond | | 100 |
| Granville, Buffalo Lodge Lake | | 600 |
| Gwinner, Aliceton Lake | | 200 |
| Denning's lake | | 100 |
| Johnson's pond | | 100 |
| Harvey, Sheyenne Lake | | 400 |
| Jamestown, James River | | 10,500 |
| Kenmare, Des Lacs Lake | | 300 |
| Thompson Lake | | 300 |
| Lisbon, Bale's pond | | 200 |
| Sheyenne River | | 600 |
| Milnor, Storm Lake | | 600 |
| Nicholson, Jackson Hill Pond | | 150 |
| Nome, Carlson's pond | | 100 |
| Pingree, James Lake | | 400 |
| Pipestem River | | 1,100 |
| Ray, Beaver Creek | | 150 |
| St. John, Cameron's lake | | 300 |
| Jarvis Lake | | 300 |
| Strium, Medd's pond | | 100 |
| Ohio: | | |
| Alexandria, Raccoon Creek | | 50 |
| Aurora Station, Harmon Pond | | 100 |
| Bradford, Greenville Creek | | 575 |
| Celina, Mercer County Reservoir | | 500 |
| Cleveland, Swimming Pond | | 100 |
| Cloverdale, Myers's pond | | 100 |
| Covington, Factory Pond | | 175 |
| Greenville Falls Dam | | 250 |
| Mohlers Eddy | | 300 |
| Stillwater River | | 500 |
| Defiance, Auglaize River | | 150 |
| Maumee River | | 150 |
| Findley, Auglaize River | | 150 |
| Fremont, Sandusky River | | 400 |
| Georgetown, Sunny Side Lake | | 50 |
| Hebron, Buckeye Lake | | 775 |
| Kent, Twin Lakes | | 300 |
| West Twins Lake | | 300 |
| Lisbon, Furnace Run | | 100 |
| Furnace Run Reservoir | | 100 |
| Nelsonville, Hocking River | | 200 |
| Newark, Buckeye Lake | | 425 |
| Newcomerstown, Tuscarawas River | | 250 |
| New Paris, White River, East Fork | | 125 |
| Ohio—Continued. | | |
| Newton Falls, Mahoning River | | 250 |
| Nova, Railroad Reservoir | | 200 |
| Paulding, Maumee River | | 500 |
| Portsmouth, Millbrook Park Lake | | 500 |
| Rarden, Scioto Brush Creek | | 225 |
| Ravenna, Lake Brady | | 300 |
| Ripley, Gardner's pond | | 75 |
| Rock Creek, Grand River | | 125 |
| St. Marys, Mercer County Reservoir | | 600 |
| Salem, Crumrine Dam | | 125 |
| Springfield, Buck Creek | | 125 |
| Warren, Youngs Run | | 150 |
| Wauseon, Miller and Becker Pond | | 295 |
| Woodsfield, Woodsfield Dam | | 200 |
| Youngstown, Lake Cohassett | | 125 |
| Lake Katrine | | 50 |
| Mahoning River | | 175 |
| Oklahoma: | | |
| Ada, Boggy Lake | | 250 |
| City Lake | | 325 |
| Lawrence Lake | | 175 |
| Radka Creek | | 250 |
| Ames, Garden Lake | | 100 |
| Jones's lake | | 100 |
| Apache, Cache Creek | | 300 |
| Chandler Creek | | 400 |
| Gassoway's lake | | 250 |
| Mission Creek | | 300 |
| Newcomb Pond | | 100 |
| Sturman's pond | | 100 |
| Ta-La Creek | | 250 |
| Toney Creek | | 300 |
| Ardmore, Ardmore Club Lake | | 250 |
| Caddo Creek | | 200 |
| Club Lake | | 175 |
| Twin Lake | | 100 |
| Atoka, City Reservoir | | 300 |
| Barron Fork, Owl Lake | | 300 |
| Bernardi, Bogardus Pond | | 100 |
| Blanchard, Bridge Creek | | 150 |
| Spring Lake | | 150 |
| Bliss, Lake 101 | | 150 |
| Ranch Lake | | 100 |
| Broken Arrow, Prairie Lake | | 100 |
| Calumet, Mac Lake | | 125 |
| Carney, Carney Lake | | 100 |
| Chattanooga, Sunnyside Lake | | 100 |
| Checotah, Spring Lake | | 140 |
| Chickasha, Lanier Pond | | 150 |
| Chilocco, Chilocco Lagoon | | 100 |
| Crescent, Kelly's pond | | 100 |
| Devol, Suter's pond | | 125 |
| Duncan, Bumpass's lake | | 100 |
| Norvell's pond | | 125 |
| Elk City, Chambers's lake | | 100 |
| Lake Coleman | | 200 |
| El Reno, Club Lake | | 200 |
| Enid, Clear Lake | | 250 |
| Gross's pond | | 250 |
| Spring Lake | | 250 |
| Eufaula, Lake Buford | | 140 |
| Faxon, Cuddy Lake | | 100 |
| Fort Sill, Medicine Bluff Creek | | 250 |
| Frederick, Ater Lake | | 125 |
| Glencoe, Lake Louisa | | 100 |
| North Side Pond | | 100 |
| Granton, Alfalfa Pond | | 100 |
| Prairie Pond | | 100 |
| Willow Pond | | 100 |
| Guthrie, Ellison Lake | | 250 |
| Johnson's pond | | 250 |
| Martin Lake | | 250 |
| Reddington Lake | | 250 |
| Twin Lakes | | 250 |
| Walker Lake | | 250 |
| Hallett, Mirror Lake | | 200 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Oklahoma—Continued. | | |
| Haskell, Oputtuna Pond | | 100 |
| Willows Pond | | 300 |
| Hennessey, Jarvis's pond | | 100 |
| Hobart, Elk Lake | | 150 |
| Hydro, Deer Creek | | 250 |
| Jet, Saline Valley Pond | | 100 |
| Kelsey, Illinois River | | 300 |
| Lawton, Medicine Creek | | 650 |
| McAlester, Cole's lake | | 150 |
| Madill, McMillan Lake | | 125 |
| Marietta, Bills Creek | | 125 |
| Cochron Creek | | 250 |
| Corcoran Creek | | 175 |
| George William Creek | | 125 |
| Haynes's lake | | 125 |
| Hickory Creek | | 250 |
| Kirkpatrick Lake | | 125 |
| Marietta Club Lake | | 200 |
| Oil Creek | | 200 |
| Rock Creek | | 150 |
| Shegan Creek | | 125 |
| Simon Lake | | 150 |
| Marlow, Adkins Pond | | 100 |
| Boone Pond | | 100 |
| Cooper's pond | | 100 |
| Findley's pond | | 150 |
| Marlow Park Lake | | 150 |
| Marlow Pond | | 150 |
| Martin's pond | | 125 |
| Murray's pond | | 150 |
| Oquin's lake | | 150 |
| Sand Hill Pond | | 200 |
| Shaws Pond | | 100 |
| Waldbridge Lake | | 125 |
| Mill Creek, Mill Creek | | 300 |
| Muskogee, Country Club Lake | | 300 |
| Newkirk, Santa Fe Lake | | 250 |
| Ninnekah, Nelson Lake | | 125 |
| Noble, Clear Brook | | 125 |
| Wadley's pond | | 100 |
| Norman, Sunnybrook Lake | | 150 |
| Ochelata, Water Works Reservoir | | 200 |
| Okeene, Schallmo Pond | | 100 |
| Oklahoma City, Belle Isle Lake | | 300 |
| Club Lake | | 200 |
| Colcord's lake | | 250 |
| Elm Lake | | 125 |
| Hogan's pond | | 200 |
| Kingkade's lake | | 250 |
| Lakeview Lake | | 300 |
| Shepherd's lake | | 375 |
| Spring Creek | | 125 |
| Osage, Osage Lake | | 150 |
| Pawhuska, Clear Creek | | 350 |
| Pawnee, Walenciak's lake | | 100 |
| Perkins, Jennings Pond | | 100 |
| Perry, Beers's lake | | 200 |
| Bostick's pond | | 200 |
| Brown's pond | | 200 |
| Casey's pond | | 200 |
| City Lake | | 500 |
| Hansen's pond | | 200 |
| Hansing's lake | | 100 |
| Keaton's pond | | 200 |
| McCune's pond | | 250 |
| Moore's pond | | 175 |
| Tucker's pond | | 125 |
| Ponca, Cottonwood Lake | | 200 |
| Evans Lake | | 200 |
| Rockbound Lake | | 200 |
| Turkey Creek | | 325 |
| Willow Pond | | 150 |
| Pond Creek, Fairview Lake | | 250 |
| Guernsey's lake | | 250 |
| Oklahoma—Continued. | | |
| Poteau, Long Lake | | 300 |
| Purcell, Club Lake | | 300 |
| Ripley, Crain's pond | | 100 |
| Sallisaw, Sallisaw River | | 300 |
| Sentinel, Big Elk River | | 350 |
| Stillwater, Carpenter's lake | | 100 |
| McKinnon's pond | | 100 |
| Stroud, Loch Kathrine | | 125 |
| Sulphur, Lowrance Lake | | 200 |
| Tahlequah, Wolfe Lake | | 100 |
| Terral, Rock Island Lake | | 100 |
| Tishomingo, Big Sandy River | | 200 |
| City Lake | | 100 |
| Foley Lake | | 200 |
| Little Sandy River | | 250 |
| Trousdale, Livvix's lake | | 100 |
| Tuttle, Davis's pond | | 100 |
| Vinita, Electric Park Lake | | 100 |
| Hall's lake | | 100 |
| Walter, Johnson's pond | | 300 |
| Watonga, Cunningham's lake | | 100 |
| Waukomis, McClennahan's pond | | 100 |
| Woodward, Reilly's springs | | 100 |
| Yukon, Maixner's pond | | 100 |
| Pennsylvania: | | |
| Bath, Spring Reservoir | | 100 |
| Big Bend, Conewago Creek | | 300 |
| Fleuent Pond | | 300 |
| Birdsboro, Hay Creek | | 350 |
| Brillharts, Cadorus Creek, South Branch | | 420 |
| Bushkill, Deer Lake | | 300 |
| Forest Lake | | 300 |
| Lake Taminent | | 300 |
| Mud Pond | | 300 |
| Chester Springs, Pickering Creek | | 300 |
| Collegeville, Willow Hurst Dam | | 100 |
| Connellsville, Indian Creek | | 80 |
| Danville, Susquehanna River | | 175 |
| Susquehanna River, North Branch | | 150 |
| Denver, Cocalico Creek | | 250 |
| East Berlin, Conewago Creek | | 350 |
| Factoryville, Lake Carey | | 300 |
| Lake Kewanna | | 300 |
| Lake Manataka | | 300 |
| Falls Station, Susquehanna River | | 350 |
| Fort Washington, Sandy Run | | 200 |
| Gettysburg, Marsh Creek | | 250 |
| Rock Creek | | 250 |
| Goldsboro, Susquehanna River | | 280 |
| Graftesford, Perkiomen Creek | | 300 |
| Greenville, Shenango River | | 300 |
| Hanover, Conewago Creek | | 300 |
| Little Conewago Creek | | 200 |
| Hatboro, Little Neshaminy Dam | | 200 |
| Hickory, Allegheny River | | 350 |
| Huntingdon, Raystown Branch | | 180 |
| Indiana, Twolick Creek | | 150 |
| Kimberton, French Creek | | 300 |
| Lancaster, Conestoga River | | 300 |
| Mount Morris, Dunkard Creek | | 1,000 |
| New Oxford, Little Conewago Creek | | 250 |
| Newtown, Neshaminy Creek | | 600 |
| Oaks, Perkiomen Creek | | 200 |
| Skippack Creek | | 200 |
| Oxford, Octoraro Creek, East Branch | | 500 |
| Palm, Gehard Dam | | 100 |
| Hosensack Creek | | 100 |
| Perkiomen Creek | | 100 |
| Phillipsburg, Lehigh River | | 200 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Pennsylvania—Continued. | | |
| Pittsburg, Griffin Reservoir | | 180 |
| Wildwood Reservoir | | 270 |
| Pocono, Naomi Lake | | 300 |
| Pocono Lake | | 350 |
| Port Royal, Tuscarora Creek | | 180 |
| Pottstown, Manatawny Creek | | 150 |
| Rahns, Perkiomen Creek | | 300 |
| Reading, Angelica Creek | | 200 |
| Jordan Creek | | 200 |
| Maiden Creek | | 250 |
| Schuylkill River | | 350 |
| Stony Creek | | 200 |
| Tulpehocken Creek | | 1,000 |
| Schwenksville, Perkiomen Creek | | 300 |
| Susquehanna, Susquehanna River | | 400 |
| Telford, Perkiomen Creek, Northeast Branch | | 200 |
| Temple, Ontelaunie Creek | | 300 |
| Troy, Cross Roads Creek | | 250 |
| North Branch | | 300 |
| Trunkeyville, Alleghany River | | 300 |
| Tunkhannock, Lake Carey | | 800 |
| Union City, Lake Pleasant | | 350 |
| Warren, Jackson Creek | | 300 |
| Weissport, Poho Poco Creek | | 250 |
| West Chester, Park's pond | | 200 |
| Wrightsville, Cabin Creek | | 140 |
| Fishing Creek | | 200 |
| Krentz Creek | | 200 |
| Susquehanna River | | 300 |
| York, Beaver Creek | | 140 |
| Big Conewago Creek | | 560 |
| Codorus Creek, South Fork | | 140 |
| Codorus Creek, West Fork | | 280 |
| Fishing Creek | | 140 |
| Fox Creek | | 280 |
| Keesey Dam | | 140 |
| Kreutz Creek | | 140 |
| Kreutz Pond | | 140 |
| Little Badams Creek | | 280 |
| Little Conewago Creek | | 140 |
| Susquehanna River | | 280 |
| York Haven, Big Conewago Creek | | 280 |
| Conewago Creek | | 560 |
| Susquehanna River | | 280 |
| Zieglersville, Perkiomen Creek | | 300 |
| Rhode Island: | | |
| Kingston, Hundred Acre Pond | | 520 |
| Westerly, Park Lake | | 390 |
| South Carolina: | | |
| Aiken, Branch Pond | | 75 |
| Shaws Creek | | 500 |
| Anderson, Branch Water Pond | | 48 |
| Brown Pond | | 48 |
| Silver Lake | | 48 |
| Angelus, Middleton's pond | | 500 |
| Belton, Saluda River | | 96 |
| Bethune, Estridge's pond | | 500 |
| Mill Branch Pond | | 500 |
| Mill Creek Pond | | 500 |
| Blacksburg, Broad River | | 1,000 |
| Blaney, Black Lake | | 1,000 |
| Borden, Pollard Mill Pond | | 70 |
| Bowling Green, Crowders Creek | | 500 |
| Crowders Creek, South Fork | | 1,000 |
| Calhoun, Twenty-three Mile Creek | | 2,000 |
| Camden, Savage's pond | | 25 |
| Chester, Sandy River | | 48 |
| Clinton, Enoree River | | 500 |

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| South Carolina—Continued. | | |
| Clover, Allison Creek | | 1,000 |
| Beaver Dam Creek | | 1,000 |
| Bigger's pond | | 500 |
| Catawba Creek | | 1,000 |
| Catawba River | | 2,000 |
| Crowders Creek | | 4,000 |
| Crowders Mill Pond | | 1,000 |
| Lower Beaver Dam Creek | | 1,000 |
| Mill Creek | | 1,000 |
| Upper Beaver Dam Creek | | 1,000 |
| Columbia, Cedar Creek | | 36 |
| Congaree Creek | | 36 |
| Cotton Mills Reservoir | | 48 |
| Dents Pond | | 96 |
| Gin Pond | | 48 |
| Poplar Branch Pond | | 36 |
| Rodgers Spring | | 36 |
| Croft, Bridge Pond | | 500 |
| Darlington, Charles Mill Pond | | 500 |
| Easley, Silver Pond | | 1,000 |
| Eastover, Colonels Creek | | 1,000 |
| Edgefield, Beaverdam Creek | | 1,000 |
| Edmund, Thresher Pond | | 500 |
| Eureka, Seigiers Mill Pond | | 500 |
| Everett, Hilliard Pond | | 500 |
| Old Mill Pond | | 500 |
| Fort Lawn, Abernathy's pond | | 500 |
| Catawba River | | 1,500 |
| Crawfords Pond | | 500 |
| Fishing Creek | | 1,000 |
| Gilbert, Hamburg Branch | | 48 |
| Great Falls, Catawba River | | 1,000 |
| Catawba River Pond | | 2,000 |
| Rocky Creek | | 1,000 |
| Southern Power Co.'s pond | | 1,000 |
| Greenville, Saluda Lake | | 4,000 |
| Greenwood, Bag Creek | | 75 |
| Curl Tail Creek Pond | | 120 |
| Cutler Branch Pond | | 75 |
| Davis's pond | | 75 |
| Garys Pond | | 25 |
| Harrison Creek | | 75 |
| Johns Creek | | 75 |
| Little Curl Tail Creek | | 135 |
| Rays Pond | | 75 |
| Wardlaws Pond | | 1,000 |
| Hartsville, Ox Pen Branch | | 500 |
| Hickory Grove, Bullock Creek | | 1,000 |
| Honea Path, Broad Mouth Creek | | 150 |
| Little Creek | | 75 |
| Little River | | 75 |
| Mattison Mill Pond | | 75 |
| Saluda River | | 75 |
| Turkey Creek | | 75 |
| Hopkins, Chappelle Creek | | 1,000 |
| Mill Creek | | 1,500 |
| Tub Mill Creek | | 1,000 |
| Inman, Ray's pond | | 500 |
| Lamar, Harrell Mill Pond | | 500 |
| Lancaster, Mosier's pond | | 500 |
| Langley, Power House Pond | | 150 |
| Laurens, Reedy River | | 48 |
| Leesville, Lightwood Creek Pond | | 75 |
| Lightwood Pond | | 500 |
| Lexington, Gable's pond | | 500 |
| Marietta, Middle Saluda River | | 1,500 |
| North Saluda River | | 2,500 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| South Carolina—Continued. | | |
| Marietta, South Saluda River | | 1,000 |
| Montmorenci, Runtz Creek | | 75 |
| Mullins, Buck Swamp | | 1,000 |
| North Augusta, Walkers Mill Pond | | 150 |
| Oakvale, Oakvale Lake | | 25 |
| Orangeburg, Spring Lakes | | 1,000 |
| Pageland, Black Pond | | 500 |
| Little's pond | | 500 |
| Spring Pond | | 500 |
| Thompson's pond | | 500 |
| Patrick, Big Juniper Creek | | 1,000 |
| Pelion, Black Creek | | 500 |
| Beaver Pond | | 500 |
| Pickens, Saluda River, South Fork | | 1,500 |
| Twelvemile River | | 1,000 |
| Ridge Springs, Flatrock Creek | | 500 |
| Gunter's pond | | 500 |
| Rock Hill, Catawba River | | 2,000 |
| Little Allison Creek | | 48 |
| St. Matthews, Milwood Pond | | 500 |
| Zeigler's pond | | 75 |
| Santuck, Broad River | | 500 |
| Seivern, Indian Branch | | 500 |
| Sharon, Bullock Creek | | 48 |
| Silverstreet, Beaverdam Creek | | 1,000 |
| Springfield, Goodland Creek Pond | | 150 |
| Steadman, Barr Pond | | 500 |
| Gantt's pond | | 500 |
| Sumter, Cains Mill Pond | | 150 |
| Pocalla Springs Pond | | 500 |
| Trenton, Bottis's pond | | 500 |
| Chevis Creek Pond | | 500 |
| Pace Run | | 1,000 |
| Shaws Pond | | 1,000 |
| Walkers Pond | | 500 |
| Troy, Clinkscales's pond | | 25 |
| Cane Creek | | 1,000 |
| Cuffy Town Creek | | 1,000 |
| Dowtin's pond | | 25 |
| Hardlabor River | | 1,000 |
| Leard's pond | | 25 |
| Long Cane Creek | | 3,000 |
| Talbert's ponds | | 50 |
| Young's pond | | 500 |
| Union, Buffalo Reservoir | | 48 |
| Yorkville, Brown's pond | | 1,000 |
| Catawba River | | 1,000 |
| Clarks Fork Pond | | 1,000 |
| Inman's pond | | 500 |
| Langdon Branch Pond | | 1,000 |
| Turkey Creek Pond | | 1,000 |
| Woodruff, Chumley's pond | | 500 |
| South Dakota: | | |
| Astoria, Oak Lake | | 300 |
| Bonesteel, Flurams Lake | | 250 |
| Canton, Big Sioux River | | 800 |
| Carthage, Lake Magnuson | | 175 |
| Clark, Antelope Lake | | 300 |
| Round Lake | | 300 |
| Dell Rapids, Big Sioux River | | 400 |
| Forestburg, Watch Lake | | 125 |
| Kimball, Pleasant Lake | | 300 |
| Lane, Flowing Wells Lake | | 175 |
| Lennox, Lake Thorsen | | 300 |
| Madison, Lake Herman | | 500 |
| Lake Madison | | 600 |
| Marion, Center Lake | | 300 |
| Silver Lake | | 300 |
| Vermillion River, West Branch | | 300 |
| Midland, Stafford's pond | | 125 |
| Oakton, Stangl's pond | | 200 |
| Parker, Dorow's pond | | 100 |

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| South Dakota—Continued. | | |
| Philips, Harding Grove Dam | | 125 |
| Plankinton, James's lake | | 150 |
| Saunders's lake | | 300 |
| Redfield, Twin Lakes | | 300 |
| Sisseton, Lake Traverse | | 400 |
| Minnesota River | | 300 |
| One Road Lake | | 300 |
| Strand Creek | | 150 |
| White Stone Lake | | 300 |
| Wilcox Creek | | 150 |
| Springfield, Emanuel Creek | | 300 |
| Tabor, Rezac Lake | | 300 |
| Tripp, Herr's lake | | 200 |
| Van Metre, Inland Lake | | 125 |
| Sun Flower Dam | | 125 |
| Watertown, Lake Pelican | | 400 |
| Tennessee: | | |
| Austral, Childress Creek | | 150 |
| Towey Creek | | 150 |
| Chatanooga, Chickamauga Creek, East Branch | | 200 |
| Chickamauga Creek, North Branch | | 200 |
| Jetts Pond | | 200 |
| Lookout Creek | | 200 |
| Spring Creek | | 200 |
| Cleveland, Candas Creek | 2,400 | |
| Greater Wildwood Lake | | 200 |
| Hall's pond | 800 | |
| Wildwood Lake | 2,400 | |
| Clinton, Clinch River | | 200 |
| Moore's pond | 800 | |
| Coal Creek, Coal Creek | | 200 |
| Cool Creek | 1,600 | |
| Conasauga, Jack River | | 150 |
| Curryhee, Little River, East Fork | 2,065 | |
| Knoxville, Little Pigeon River, East Fork | 2,055 | |
| Pigeon River, East Fork | 2,055 | |
| Loudon, Little Tennessee River | | 200 |
| McGhee, Eagle Lake | | 150 |
| Memphis, Toney Pool | | 105 |
| Newcomb, Elk Fork Creek | | 200 |
| Oakdale, Emory River | | 300 |
| Tennga, Conasauga River | | 150 |
| Townsend, Little River | 3,425 | |
| Texas: | | |
| Albany, Honeycutt's pond | | 100 |
| Roseland Lake | | 100 |
| Alto, Bailey Pond | | 100 |
| Alvarado, Rentfro's pond | | 100 |
| Amarillo, Paladora Pond | | 900 |
| Angus, Stewart's pond | | 400 |
| Annona, Hill's pond | | 200 |
| Kickapoo River | | 500 |
| Arp, Hughes's pond | | 200 |
| Athens, Shelton Mill Pond | | 400 |
| Austin, Barton Creek | | 500 |
| Avoca, Martin's pond | | 200 |
| Axtell, Biggerstaff's pond | | 100 |
| Bellevue, Ford Lake | | 400 |
| Bennetts, Cat Tail Lake | | 150 |
| Bettie, Sewell's pond | | 100 |
| Bland Lake, Bland's pond | | 800 |
| Blossom, Blossom Club Pond | | 150 |
| Boerne, Cibolo Pond | | 150 |
| Bowie, Black Pond | | 200 |
| Waggoner Pond | | 100 |
| Brady, Live Oak Creek | | 200 |
| Brandon, Giles's lake | | 400 |
| Bronson, Clear Lake | | 300 |
| Travis Branch | | 950 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Texas—Continued. | | |
| Brookesmith, Buena Vista Lake | | 100 |
| Brownsville, Horseshoe Resaca Lake | | 1,000 |
| Resaca de la Guerra Lake | | 1,000 |
| Brownwood, Allison's pond | | 200 |
| Camp's pond | | 150 |
| Collins's pond | | 200 |
| McGaugh Pond | | 200 |
| Snyder's pond | | 1,000 |
| Bryan, Nall's lake | | 150 |
| Buckholtz, Helmcamp Pond | | 25 |
| Calallen, Casa Morado Reservoir | | 160 |
| Calvert, Calvert Country Club Lake | | 500 |
| Canyon City, Canyon Lake | | 600 |
| Paladora Creek | | 725 |
| Pritchard's pond | | 600 |
| Terra Blanco Creek | | 725 |
| Carlos, Lake Carlos | | 800 |
| Caro, Lower Saner Pond | | 150 |
| Celina, English Lake | | 329 |
| Moore's lake | | 300 |
| Smith's lake | | 350 |
| Stelzer's pool | | 125 |
| Center, Wood Lake | | 300 |
| Center Point, Medina River | | 1,500 |
| Childress, Lake Keeler | | 1,150 |
| Lake Scott | | 500 |
| Clarendon, Allan Creek | | 300 |
| Clarksville, Clarksville Country Club Lake | | 500 |
| Cleburne, Cleburne Country Club Lake | | 200 |
| Willow Pond | | 100 |
| Clifton, Christenson's lake | | 112 |
| Reeder's pond | | 112 |
| Clyde, Deadman Pond | | 150 |
| Colmesneil, Lively's lake | | 150 |
| Colorado, McCreless's lake | | 200 |
| Plasted's pond | | 600 |
| Spring Creek Pond | | 300 |
| White Elephant Lake | | 300 |
| Cooledge, Cottonwood Lake | | 100 |
| Long Branch Lake | | 200 |
| McReynolds's reservoir | | 50 |
| Valley Lake | | 201 |
| Corsicana, Burks Lake | | 1,000 |
| Morse's lake | | 200 |
| Woodley Pond | | 500 |
| Cotulla, Chapman Lake | | 400 |
| Poteet Lake | | 400 |
| Crowell, Burress's pond | | 300 |
| Campbell's pond | | 150 |
| Railroad Pond | | 400 |
| Cuero, Hickory Lake | | 1,500 |
| Cushing, Becton Lake | | 50 |
| Dale, Eppright Pond | | 200 |
| Dalhart, Rita Blanca Lake | | 200 |
| Dallas, Bachman Pond | | 375 |
| Coombs Creek | | 775 |
| Tenison Lake | | 300 |
| Decatur, Halsell Lake | | 100 |
| DeKalb, Hathcocks's pond | | 300 |
| Del Rio, Devils River | | 500 |
| Denison, Lake Denison | | 800 |
| Denton, Country Club Lake | | 300 |
| Detroit, Clarksville Club Lake | | 400 |
| Detroit Club Lake | | 150 |
| Sample's pond | | 100 |
| D'Hanis, Clay Hill Pond | | 300 |
| Doucette, Pope's pond | | 400 |
| Stewart's lake | | 200 |
| Eagle Pass, Rosita Creek | | 1,000 |
| Eastland, Kinnebrew Pool | | 300 |
| Edgewood, Davis Pond | | 150 |
| Elgin, Christian Lake | | 150 |
| Egleston Lake | | 134 |
| Elgin, Keeble's lake | | 100 |
| Elkhart, Elkhart Lake | | 2,000 |
| Pate's pond | | 50 |
| Encinal, Johnson Lake | | 500 |
| Fluvanna, Little Bull Pond | | 300 |
| Fort Worth, Concrete Pond | | 32 |
| Davie Burns Lake | | 50 |
| Happy Lake | | 300 |
| Hush Lake | | 213 |
| Lake View | | 300 |
| Lake Wandry | | 213 |
| Tandy's lake | | 200 |
| Franklin, Cavitt's pond | | 200 |
| Frisco, Stewarts Creek Lake | | 500 |
| Gainesville, Gainesville Club Lake | | 600 |
| Garrison, Brickyard Reservoir | | 100 |
| Fishing Club Lake | | 500 |
| Giddings, Braesel's pond | | 100 |
| Carmean's pond | | 200 |
| Dunk's pond | | 200 |
| Gily Lake | | 50 |
| Mitschkes Pond | | 100 |
| Namkin's pond | | 100 |
| Quarry Lake | | 150 |
| Raube's pond | | 200 |
| Schautschick's pond | | 100 |
| Schkades Pond | | 150 |
| Sumff's pond | | 100 |
| Unger's pond | | 150 |
| Wilson's pond | | 100 |
| Gladwater, Phillips Spring Lake | | 150 |
| Goldthwaite, Cain's pond | | 200 |
| Gordon, Lake Creek | | 1,000 |
| Goree, Goode's lake | | 300 |
| Granbury, Lake Add-Ran | | 200 |
| Roberson Creek | | 185 |
| Grand Saline, Dunn Mill Pond | | 100 |
| Grandview, Country Club Lake | | 1,200 |
| Sturges's pond | | 150 |
| Grapeland, Hodge's lakes | | 600 |
| Keen Crystal Pond | | 500 |
| Grapevine, Willey Lake | | 150 |
| Yancy Lake | | 200 |
| Greenbrier, Beckham Pond | | 400 |
| Butler Pond | | 400 |
| Country Club Lake | | 400 |
| Indian Creek | | 400 |
| Leek Creek | | 400 |
| Mud Creek | | 400 |
| South Side Lake | | 500 |
| Hamlin, Country Club Lake | | 800 |
| Harry Wynn Pond | | 200 |
| Harlingen, Dilworth Lake | | 500 |
| Harlingen Lake | | 500 |
| Harrold, Ayers's pond | | 360 |
| Haskell, Bevers's lake | | 300 |
| Hico, Fairview Lake | | 150 |
| Gilmore Creek | | 200 |
| Higgins, First Creek | | 300 |
| Poor Farm Lake | | 150 |
| High Island, Smith's lake | | 1,000 |
| Hillsboro, Park Lake | | 400 |
| Hubbard, Jones's lake | | 100 |
| Leftwich Lake | | 200 |
| Jacksboro, Spring Pond | | 100 |
| Sunny Brook Lake | | 100 |
| Joaquin, Garrett's pond | | 150 |
| Kaufman, Clark Lake | | 200 |
| Pyle's lake | | 816 |
| Sapp's pool | | 200 |
| Taylor's pond | | 634 |
| Willow Springs | | 200 |
| Kemp, Berry Lake | | 300 |
| Moorehead Lake | | 300 |
| Porters Bluff Lake | | 400 |
| Kingsville, Christenson's reservoir | | 100 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Texas—Continued. | | |
| Kyle, Goforth Pond | | 150 |
| Ladonia, Burton's pond | | 300 |
| Elliott's pond | | 300 |
| Water Works Pond | | 300 |
| LaGrange, Crownover Lake | | 1,500 |
| LaMarque, Irrigation Reservoir | | 1,500 |
| Laredo, Bulls Eye Lake | | 500 |
| Davis's pond | | 300 |
| Moritas Lake | | 500 |
| Perren's pond | | 400 |
| Lillian, Ball's pond | | 150 |
| Lillian Lake | | 150 |
| Lindale, Roberts's pond | | 150 |
| Llano Grande, Llano Grande Lake | | 1,000 |
| Llano, Llano River | | 5,000 |
| Shumake's pond | | 50 |
| Longview, Harris's lake | | 400 |
| Melton's lake | | 200 |
| Taylor's pond | | 300 |
| Lovelady, Patterson Lake | | 1,000 |
| Lyford, Bamboo Lake | | 100 |
| McGregor, Leon River | | 500 |
| South Bosque Creek | | 400 |
| Mabank, Caruthers's pond | | 200 |
| Cockerell's pond | | 54 |
| Grubb's pond | | 150 |
| Hebel's pond | | 200 |
| McCoy's pond | | 200 |
| Pepper's pond | | 200 |
| Robertson's pond | | 250 |
| Wind Mill Pond | | 200 |
| Madison, Donaho's pond | | 50 |
| Mahl, Pleasant Hill Lake | | 75 |
| Watkins's pond | | 50 |
| Malakoff, Bartlett's pond | | 100 |
| Brickyard Pond | | 200 |
| Flagg's lake | | 400 |
| Manchaca, Labenski Creek | | 400 |
| Onion Creek | | 500 |
| Marfa, Barker's pond | | 100 |
| Marshall, Fern Lake | | 500 |
| McClaran's lake | | 250 |
| Maxwell, Schawe Lake | | 1,000 |
| Memphis, Brice's lake | | 160 |
| Cottonwood Creek | | 500 |
| Jones Creek | | 400 |
| Noel's lake | | 100 |
| Parker Creek | | 500 |
| Salt Creek | | 900 |
| Spring Creek | | 500 |
| Spring Lake | | 100 |
| Mercedes, Davis Lake | | 1,000 |
| Meridan, Johnson's lake | | 200 |
| Merkel, Martin's lake | | 650 |
| Miller's lake | | 400 |
| Valley Farm Lake | | 300 |
| Miles, Lipan Creek | | 410 |
| Milford, Katy Pond | | 300 |
| Mineola, Conger Pond | | 28 |
| Lake Park Pond | | 100 |
| Willow Pond | | 150 |
| Mingus, Nine Lake | | 300 |
| Thurber Lake | | 1,000 |
| Mount Calm, Herring Lake | | 100 |
| Mount Pleasant, Lake Dellwood | | 150 |
| Mount Selman, Phialpha Lake | | 250 |
| Mount Vernon, Devall's pond | | 150 |
| Holbrook Lake | | 150 |
| Nacogdoches, Fern Lake | | 1,000 |
| Stone Lake | | 800 |
| Navasota, Shell Lake | | 1,000 |
| Yarboro Lake | | 1,000 |
| New Braunfels, Comal Creek | | 600 |
| Guadalupe River | | 300 |
| Rebecca Creek | | 1,000 |
| North Zulch, Railroad Reservoir | | 600 |
| Texas—Continued. | | |
| Oakwoods, Glaze Lake | | 800 |
| Palestine, Huff Lake | | 900 |
| Spring Park Lakes | | 600 |
| Panhandle, West Dippon Creek | | 500 |
| Paris, Bankhead Lake | | 400 |
| Gordon Country Club Lake | | 1,000 |
| Oak Grove Lake | | 150 |
| Silver Lake | | 100 |
| Pecos, Edward's pond | | 175 |
| Pawkett's pond | | 150 |
| Penelope, Sealy Pond | | 200 |
| Pilot Point, Lake Feeley | | 100 |
| Pittsburg, Adair Pond | | 100 |
| City Lake | | 200 |
| Davis Club Lake | | 150 |
| Ferndale Lake | | 1,000 |
| Flag Pond | | 300 |
| Flannagan Pond | | 1,000 |
| Hargrove Pond | | 150 |
| Holt Pond | | 300 |
| Hopkins's lake | | 30 |
| Knights Mill Pond | | 1,000 |
| Lilly Pond | | 200 |
| Music Pond | | 200 |
| Pilk Lake | | 200 |
| Reves Lake | | 1,000 |
| Reynolds Lake | | 1,000 |
| Star Lake | | 200 |
| Tittle Lake | | 300 |
| Willow Lake | | 305 |
| Plano, City Reservoir | | 1,000 |
| Queen City, Griffin's pond | | 30 |
| Randolph, Randolph Pool | | 300 |
| Ranger, Water Works Lake | | 1,000 |
| Ravenna, Eubanks's pond | | 150 |
| Seals's pond | | 150 |
| Ricardo, Bertelson's reservoir | | 100 |
| Ringgold, Woolsey's pond | | 200 |
| Rockdale, Clear Lake | | 300 |
| Rogers, Rogers Lake | | 200 |
| Rosebud, Ocker's pond | | 100 |
| Williams Creek | | 400 |
| Rotan, Cave Pond | | 150 |
| Royston, Lake View | | 150 |
| Saginaw, Canes Pond | | 200 |
| Salesville, Herring's lake | | 800 |
| San Angelo, Bismark Lake | | 500 |
| Concho River | | 500 |
| Cunningham Lake | | 500 |
| Doorkey Lake | | 500 |
| Gardners Lake | | 500 |
| Mires Lake | | 500 |
| North Concho River | | 500 |
| Pecan Creek | | 500 |
| Scines Lake | | 500 |
| Spring Creek | | 500 |
| Twin Mountains Lake | | 500 |
| San Antonio, Anderson Club Pond | | 600 |
| Billy Lake | | 900 |
| Guinn's lake | | 60 |
| Lake Toft | | 400 |
| Sanger, Duck Creek | | 400 |
| Hughes's pond | | 50 |
| Sarber, Sarber Lake | | 500 |
| Schulenburg, Running Spring | | 50 |
| Seguin, Duck Lake | | 50 |
| Sherman, O'Hanlon's pond | | 100 |
| Stamford, Boulevard Pond | | 500 |
| Park Pond | | 300 |
| Swenson Pond | | 500 |
| Tank Lake | | 300 |
| University Park Lake | | 500 |
| Wedington Pond | | 200 |
| Sulphur Springs, Booker's pond | | 200 |
| Byrd's pond | | 50 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Texas—Continued. | | |
| Sulphur Springs, Higdon Pond | | 10 |
| Pound Lake | | 10 |
| Reiley Lake | | 20 |
| Thompson Pond | | 20 |
| Woodland Lake | | 150 |
| Taylor, Taylor Lake | | 150 |
| Temple, Lake Polk | | 300 |
| Terrell, Arnolds Lake | | 100 |
| Cooper Lake | | 200 |
| Country Club Lake | | 900 |
| Garrett's pond | | 100 |
| Gordon Lake | | 500 |
| Griffith League Lake | | 100 |
| Landos Lake | | 400 |
| Martin's lake | | 100 |
| Oleander Lake | | 100 |
| Sand Branch Lake | | 100 |
| Walton Lake | | 100 |
| White Rock Lake | | 150 |
| Timpson, Green's lake | | 100 |
| Wedgeworth's lake | | 300 |
| Troup, Gourley Lake | | 200 |
| Waco, Holloway Lake | | 300 |
| Oak Lake | | 300 |
| Turner's lake | | 100 |
| Waller, Ellis Pond | | 400 |
| Walnut Springs, Smitham's lake | | 50 |
| Waxahachie, Bell Branch Lake | | 800 |
| Bullard's lake | | 200 |
| Davis's lake | | 200 |
| Katy Fishing Club Lake | | 500 |
| Spalding Lake | | 475 |
| West End Lake | | 485 |
| Weatherford, Briten Branch | | 50 |
| Hammond Lake | | 2,300 |
| Webbs, La Zeta Pond | | 400 |
| Weinert, Edwards Lake | | 150 |
| Lake Creek Tank | | 750 |
| West, McClellan Lake | | 400 |
| Wetmore, Classen's pond | | 50 |
| Wichita Falls, Woodall's pond | | 300 |
| Wills Point, McKinney Lake | | 100 |
| Winsboro, Harris's pond | | 20 |
| Wortham, Hardy Gin Lake | | 150 |
| Yoakum, Mergenthal Pond | | 100 |
| Shampaign's lake | | 200 |
| Zulch, Zulch Lake | | 150 |
| Utah: | | |
| Centerville, Perkins' pond | | 100 |
| Ogden, Brigham Pond | | 200 |
| Virginia: | | |
| Alleghany, Dunlap Creek | | 300 |
| Ashland, Ashland Park Pond | | 75 |
| King Pond | | 75 |
| Atlee, Cross Creek Pond | | 100 |
| Blackstone, Webb's pond | | 150 |
| Bristol, Columbian Paper Co.'s reservoir | | 200 |
| Broad Run, Broad Run | | 75 |
| Brookneal, Falling Creek | | 250 |
| Buffalo Junction, Aarons Creek | 3,000 | |
| Hites Pond | | 250 |
| Pools Pond | | 250 |
| Watkins Mill Pond | 1,000 | 250 |
| Callaghan, Dunlop Creek | | 400 |
| Potts Creek | | 400 |
| Chatham, Crystal Lake | 1,000 | |
| Hedrick's pond | 1,000 | |
| Church Road, Burnt Quarter Pond | | 200 |
| Claremont, Snyder's pond | | |
| Clarksville, Grassy Creek | 2,000 | |
| Island Creek | 1,000 | |
| Lewis's lake | 2,000 | |

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Virginia—Continued. | | |
| Clarkton, Staunton River Lake | | 500 |
| Cobham, Cobham Park Pond | | 100 |
| Cohoke, Cohoke Club Pond | | 75 |
| Cologne, Bland's pond | | 75 |
| Craigsville, Campbell Pond | | 75 |
| Culpeper, Smith Run Pond | | 350 |
| Danville, Dan River | 1,000 | |
| Drakes Branch, Twitty Creek | | 350 |
| Drewryville, Drewry Mill Pond | | 250 |
| Pope's pond | | 250 |
| East Lexington, North River Pond | | 200 |
| Elmont, Chickahominy Mill Pond | | 75 |
| Evington, Haden Branch | | 200 |
| Farmville, Bolling's pond | | 250 |
| Richardson's pond | | 200 |
| Fishers Hill, Shenandoah River | | 200 |
| Fredericksburg, Corenty Pond | | 40 |
| Rappahannock River | | 80 |
| Gordonsville, Atkinson's pond | | 300 |
| Harrisonburg, Dry River | | 100 |
| Linville Creek Lake | | 100 |
| North River | | 100 |
| Hollins, Carvins Creek | 2,000 | |
| Hot Springs, Jackson River | | 400 |
| Hunters, Little Hunting Creek | | 150 |
| Heswick, Christan's pond | | 75 |
| La Crosse, Meherrin River | 3,000 | |
| Lawrenceville, Great Creek | | 300 |
| Meherrin River | | 300 |
| Rose Creek | | 250 |
| Lawyers, Leech's pond | 1,000 | |
| Leesburg, Goose Creek | | 50 |
| Potomac River | | 200 |
| Limeton, Shenandoah River, South Branch | | 300 |
| Louisa, Kent Mill Pond | | 100 |
| Lynchburg, Odd Fellows Home Lake | | 700 |
| Martinsville, Smith River | 3,000 | |
| Moseley Junction, Oak Hill Pond | | 100 |
| Mt. Jackson, Mill Creek | | 100 |
| Shenandoah River | | 100 |
| Shenandoah River, North Branch | | 100 |
| Smith Creek | | 100 |
| Natural Bridge, Buffalo Creek | | 250 |
| Nelson, Aarons Creek | | 125 |
| New Castle, Craig Creek | 5,000 | 250 |
| Johns Creek | | 250 |
| Newport News, Jordan's lake | | 125 |
| Norfolk, Lake Modoc | | 200 |
| North River, North River | | 100 |
| Nottaway, Robertson's pond | | 125 |
| Oak Ridge, Oak Ridge Pond | | 500 |
| Occoquan, Metzger's pond | | 40 |
| Occoquan River | | 80 |
| Wells Pond | | 40 |
| Overall, Shenandoah River | | 300 |
| Oyster Point, Oyster Point Pond | | 200 |
| Youngs Mill Pond | | 200 |
| Pamplin City, Bakers Mill Pond | | 250 |
| Calhoun Pond | | 250 |
| Rossers Mill Pond | | 250 |
| Penola, Mataponi Pond | | 80 |
| Petersburg, Brandon Pond | | 200 |
| Cains Mill Pond | | 200 |
| Daniels Pond | | 75 |
| Kutchan Pond | | 75 |
| Lake Ferndale Park | | 75 |
| West End Park Lake | | 150 |
| Rapidan, Taliaferro Lake | | 150 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Virginia—Continued. | | |
| Richmond, Broad Lock Pond | | 1,000 |
| Bryan Pond | | 1,000 |
| Dead Creek Pond | | 1,000 |
| Falling Creek | | 1,500 |
| Flat Rock Pond | | 1,000 |
| Fulton Club Pond | | 1,500 |
| Garlick Pond | | 1,000 |
| Lakeside Pond | | 100 |
| Licking Creek Pond | | 1,000 |
| MacGregor Hall Pond | | 1,000 |
| Newman Pond | | 1,000 |
| Powhite Pond | | 1,000 |
| Providence Forge Pond | | 1,000 |
| Reservoir Lake | | 100 |
| Spring Pond | | 100 |
| Rockfish, Hardwick Lake | | 75 |
| Plainview Pond | | 100 |
| Shawen's pond | | 100 |
| Rocky Mound, Furnace Creek | 1,000 | |
| Big River | 2,000 | 200 |
| Roxbury, Etna Mill Pond | | 250 |
| Rural Retreat, Scott's pond | | 2,000 |
| Salem, Roanoke River | | 200 |
| Saxe, Charlotte Pond | | 225 |
| Shipman, Oak Ridge Pond | | 100 |
| Soudan, Grass Creek | 3,000 | |
| South Boston, Butram Creek | | 200 |
| Dan River | | 300 |
| Strasburg, Shenandoah River | | 75 |
| Shenandoah River, West Fork | | 75 |
| Stuart, Mayo River | | 350 |
| Swords Creek, Clinch River | | 200 |
| Sycamore, Hunt Mill Pond | | 250 |
| Tappahannock, Mornington Lake | | 200 |
| Timber Ridge, North River | | 250 |
| Urbanna, Jackson Mill Pond | | 200 |
| Victoria, Abilene Reservoir | 2,000 | |
| Victoria Reservoir | 2,000 | |
| Village, Smithers Mill Pond | | 100 |
| Virginia Beach, Lake Christine | | 300 |
| Wadesville, Opequan Creek | | 200 |
| Wakefield, Brittle's pond | | 100 |
| Walkerford, James River | | 400 |
| Walkers Station, Vaidens Mill Pond | | 400 |
| Warren, Ballinger Creek | | 100 |
| Waterlick, Shenandoah River | | 75 |
| Weems, Carter Creek | | 200 |
| Winchester, Back Creek | | 200 |
| Hogue Creek | | 200 |
| Woodstock, Shenandoah River, North Branch | | 100 |
| Wytheville, Reed Creek | 3,000 | 350 |
| Washington: | | |
| Anacortes, Lake Campbell | | 400 |
| Paso Lake | | 300 |
| Medical Lake, Clear Lake | | 400 |
| Silver Lake | | 400 |
| Montesano, Lake Neuwatzel | | 300 |
| Newport, Casey Lake | | 250 |
| Tacoma, Madrona Lake | | 200 |
| West Virginia: | | |
| Belva, Peters Creek | | 150 |
| Bretz, Deckers Creek | | 4,000 |
| Caddell, Cheat River | | 4,000 |
| Capon Springs, Great Cacapon River | | 900 |
| Chapmansville, Guyandotte River | | 240 |
| Charleston, Elk River | | 200 |
| Elm Grove, Big Wheeling Creek | | 400 |
| Fairmont, Monongahela River | | 400 |
| Tygarts Valley River | | 400 |

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| West Virginia—Continued. | | |
| Felton, Tygarts Valley River | | 400 |
| Glenalum, Tug River | | 150 |
| Grafton, Tygarts Valley River | | 400 |
| Harpers Ferry, Potomac River | | 1,150 |
| Little Falls, Monongahela River | | 400 |
| Morgantown, Deckers Creek | | 200 |
| Monongahela River | | 640 |
| Orleans Road, Potomac River | | 1,000 |
| Paw Paw, Great Cacapon River | | 200 |
| Philippi, Middle Fork River | | 400 |
| Tygarts Valley River | | 400 |
| Ripley, Mill Creek | | 80 |
| Romney, Potomac River, South Branch | | 560 |
| St. Albans, Coal River | | 400 |
| Springfield, Potomac River, South Branch | | 300 |
| Star City, Donkard Creek | | 400 |
| Sutton, Elk River | | 1,400 |
| Weston, Monongahela River, West Fork | | 600 |
| Woodland, Fish Creek | | 400 |
| Wisconsin: | | |
| Albany, Sugar River | | 500 |
| Butternut, Butternut Lake | | 600 |
| Cable, Cable Lake | | 400 |
| Henry Lake | | 150 |
| Cisco, Palmer Lake | | 400 |
| Cumberland, Beaver Dam Lake | | 400 |
| Durand, Bear Lake | | 200 |
| Plummer Lake | | 200 |
| Thompson Lake | | 200 |
| Elcho, Bass Lake | | 300 |
| Enterprise Lake | | 500 |
| Otter Lake | | 250 |
| Elkhart, Crystal Lake | | 300 |
| Elmwood, Eau Galle Mill Pond | | 300 |
| Elroy, Mill Pond | | 250 |
| Fairchild, Eau Claire River, North Fork | | 400 |
| Fox Lake, Fox Lake | | 800 |
| Genoa, Mississippi River | | 1,668 |
| Gordon, Bass Lake | | 400 |
| Blue Gill Lake | | 200 |
| Hartford, Pike Lake | | 400 |
| Hatfield, Lake Arbutus | | 600 |
| Haugen, Bear Lake | | 600 |
| Devils Lake | | 500 |
| Hawkins, Shamrock Lake | | 250 |
| Hayward, Grindstone Lake | | 300 |
| Lake Court O'Reilles | | 400 |
| Tripp's lake | | 200 |
| Whitefish Lake | | 300 |
| Hillsboro, Baraboo River, South Fork | | 250 |
| Hurley, Island Lake | | 400 |
| Independence, Bugle Lake | | 400 |
| Trempealeau River | | 500 |
| La Crosse, Mississippi River | | 4,666 |
| Lake Beulah, Lake Beulah | | 1,200 |
| Lake Geneva, Lake Como | | 1,000 |
| Lavalle, Duren | | 200 |
| Little Baraboo Pond | | 200 |
| Long Lake, Fay Lake | | 400 |
| Long Lake | | 400 |
| Lublin, Lublin Lake | | 300 |
| Medford, Lake Esadore | | 200 |
| Lake Murat | | 200 |
| Lake Perkins | | 400 |
| Powell Lake | | 200 |
| Richter Lake | | 200 |
| Sacket Lake | | 200 |
| Twin Lakes | | 200 |
| Mellon, Beaver Lake | | 200 |
| Carrot Lake | | 400 |
| Herbert Lake | | 200 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

LARGE-MOUTH BLACK BASS—Continued.

| Disposition. | Fry. | Fingerlings. |
|---|---|---|
| Wisconsin—Continued. | | |
| Mellon, Island Lake | | 400 |
| Lake Caroline | | 400 |
| Menomonie, Cub Lake | | 200 |
| Lake Menomonie | | 400 |
| Red Cedar | | 500 |
| Stumps Slough | | 300 |
| Youngs Lake | | 400 |
| Merton, Lake Keesar | | 400 |
| Muscoda, Mill Creek Pond | | 400 |
| New Auburn, Jenstow Lake | | 200 |
| Shatick Lake | | 250 |
| Okauchee, Okauchee Lake | | 600 |
| Pelican, Pelican Lake | | 800 |
| Post Lake | | 500 |
| Prairie du Chien, Mississippi River | | 4,250 |
| Richfield, Lake Amy Belle | | 400 |
| Sheboygan Falls, Sheboygan River | | 250 |
| Wisconsin—Continued. | | |
| Solon Springs, Twin Lakes | | 450 |
| Sparta, La Crosse River | | 800 |
| Perch Lake | | 300 |
| State Line, Bass Lake | | 200 |
| Black Oak Lake | | 400 |
| Tomah, Water Mill Pond | | 300 |
| Tomahawk Lake, Little Newman Lake | | 250 |
| Turtle, Long Lake | | 400 |
| Victory, Mississippi River | | 166 |
| Wonewoc, Baraboo River | | 500 |
| Baraboo River, North Branch | | 500 |
| Wyoming: | | |
| Basin, Red Canyon Reservoir | | 125 |
| Shoshoni, Big Horn River | | 400 |
| Total[a] | 56,600 | 665,868 |

[a] Lost in transit, 25,135 fingerlings.

SUNFISH (BREAM).

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Alabama: | |
| Gordo, Hannah's pond | 100 |
| Haleyville, Haleyville Pond | 125 |
| Hodges, Strifel's pond | 100 |
| Kennedy, Savage's pond | 100 |
| Reform, Harper's pond | 100 |
| Sulligent, Maddox's pond | 100 |
| Tuscumbia, Tuscumbia Spring | 100 |
| Vance, Lawrence's pond | 125 |
| Arkansas: | |
| Greenwood, Saling's pond | 150 |
| Harrison, Bates's pond | 150 |
| Helena, Mississippi River | 83,665 |
| Hope, Brandon's pond | 100 |
| Johnson's pond | 100 |
| Little Rock, Asylum Pond | 100 |
| Mammoth Springs, Mammoth Springs | 200 |
| Marshall, Horton's pond | 150 |
| Nashville, Mine Creek | 250 |
| Reese's pond | 100 |
| Whelen, Edmond's pond | 100 |
| Connecticut: | |
| Leonard Bridge, Hop River | 600 |
| Seymour, Beecher's pond | 300 |
| Florida: | |
| Ehren, Floral Lake | 100 |
| Tampa, Saddle Bag Lake | 100 |
| Georgia: | |
| Adel, Beaver Dam Bay | 50 |
| Saddlebag Pond | 50 |
| Americus, Mountain Creek Pond | 50 |
| Ashburn, Clear Pond | 50 |
| Fitzgerald's pond | 50 |
| Atlanta, Moccasin Lake | 110 |
| Blue Ridge, Carter's pond | 120 |
| Chamblee, Jones's pond | 25 |
| Charing, Branch Pond | 50 |
| Clarkesville, Edward's pond | 100 |
| Hazel Creek | 150 |
| Clayton, Justus's pond | 125 |
| Collins, Jarriel's pond | 50 |
| Wilson's pond | 50 |
| Wrenn's pond | 50 |
| Georgia—Continued. | |
| Cuthbert, Nochaway Creek | 100 |
| Wade's pond | 50 |
| Ellavi le, Murray's pond | 100 |
| Ellabelle, Tony Branch | 200 |
| Flint, Stegall's lake | 400 |
| Forsythe, Bessie Tift Lake | 50 |
| Jackson's pond | 50 |
| Garfield, Oglesby's pond | 100 |
| Glennville, De Loach's pond | 50 |
| Lewis's pond | 50 |
| Graymont, Cowert's pond | 100 |
| Wetherford's pond | 100 |
| Halcyondale, Simmons's pond | 50 |
| Junction City, Carlisle's pond | 50 |
| Moore's pond | 50 |
| Leesburg, Kinchatoonee Creek | 100 |
| Macon, Biarly Lodge Pond | 150 |
| Recreation Club Lake | 100 |
| Manchester, Manchester Pond | 100 |
| Marshallville, Grisolm Spring Pond | 100 |
| Outing Club Pond | 100 |
| Rumple's pond | 100 |
| Mayfield, Long's pond | 200 |
| Millen, Buckhead Creek | 200 |
| Ogeechee River | 100 |
| Munnerlyn, Rosemary Creek | 100 |
| Rupert, Bodiford's pond | 50 |
| Scarboro, Ogeechee River | 100 |
| Smithville, Kinchatoonee Creek | 100 |
| Muckalee Creek | 100 |
| Stillmore, Cannochee Pond | 100 |
| Stinson, Lake Benson | 225 |
| Summit, Bowie's pond | 100 |
| Brown's pond | 100 |
| Cowart's pond | 50 |
| Spring Branch Pond | 50 |
| Turner's pond | 50 |
| Sylvester, Pope's pond | 50 |
| Talbotton, Maxwell's pond | 50 |
| Parker's pond | 50 |
| Silver Lake | 50 |
| Wilson's pond | 50 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### SUNFISH (BREAM)—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Georgia—Continued. | |
| Tennille, Boatright's pond | 100 |
| The Rock, Stafford's pond | 50 |
| Tifton, Purdy's pond | 50 |
| Ty Ty, Parks's pond | 50 |
| Vienna, Lane's pond | 50 |
| Wade, Brinson's pond | 50 |
| Illinois: | |
| Belleville, Gauss's lake | 200 |
| Rheins's lake | 100 |
| Olney, Olney Reservoir | 100 |
| Indiana: | |
| Borden, Koerber's pond | 100 |
| Spring Pond | 100 |
| Bristol, Newman's pond | 100 |
| Carbon, Harrold's pond | 300 |
| Chrisney, Oak Hill Pond | 100 |
| Dubois, Silver Pond | 100 |
| Edinburg, Spring Lake | 300 |
| Fairmount, Little's pond | 100 |
| Manzanita Lake | 100 |
| Farmersburg, Lewis's pond | 200 |
| Kewanna, Bruce Lake | 400 |
| Lima, Still Lake | 200 |
| Madison, Big Creek | 350 |
| New Albany, Old Cave Pond | 100 |
| Ossian, Willow Pond | 100 |
| Silver Lake, Silver Lake | 100 |
| Veedersburg, Coal Creek | 800 |
| Iowa: | |
| Casey, Spring Lake | 200 |
| Cumberland, Hawthorn Lake | 100 |
| Fort Madison, Green Bay | 1,100 |
| Lime Springs, Upper Iowa River | 4,500 |
| North McGregor, Mississippi River | 73,250 |
| Underwood, Geise's pond | 100 |
| Kansas: | |
| Grenola, Cana River | 200 |
| Kentucky: | |
| Beard, Cypress Pond | 100 |
| Elizabethtown, Heady's pond | 100 |
| Eminence, Boyne's pond | 100 |
| Helburn's pond | 100 |
| Glasgow, Fallen Timber Creek | 150 |
| Grays, Lynn Camp Pond | 400 |
| Louisville, Lake Lansdowne | 300 |
| Saxton, Beech's pond | 400 |
| Sonora, Ireland's pond | 150 |
| Louisiana: | |
| Bogalusa, Bogalusa Pond | 300 |
| Homer, Gladney's pond | 100 |
| Spring Lake | 100 |
| Ruston, Pugh's pond | 100 |
| Scotland, Scotland Plantation Lake | 200 |
| Maryland: | |
| Bel Air, Barnes Run | 150 |
| Chevy Chase, Locust Lake | 400 |
| Landover, Oak Hill Pond | 250 |
| Mountain Lock, Potomac River | 5,600 |
| Massachusetts: | |
| Plymouth, King's pond | 300 |
| West Pond | 300 |
| Minnesota: | |
| Brownsville, Mississippi River | 17,300 |
| Smiley, Pelican Lake | 500 |
| Mississippi: | |
| Blue Mountain, Simmons' pond | 100 |
| Booneville, Gin Pond | 100 |
| Brookhaven, Applewhite's pond | 100 |
| Brooksville, Dixie Pond | 100 |
| Peterson's pond | 150 |
| Centreville, Dick's pond | 150 |
| Willow Lake | 150 |
| Collins, Mayfield's pond | 125 |
| Columbus, Fig Pond | 300 |

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Mississippi—Continued. | |
| Corinth, Pound's pond | 100 |
| Rilla Pond | 100 |
| Waukomis Lake | 100 |
| Crenshaw, Berk's pond | 100 |
| Mitchell's pond | 100 |
| Durant, McDonald's pond | 100 |
| Enterprise, Kamper's pond | 100 |
| Gandsi, Spring Pond | 100 |
| Hazelhurst, Harrison's pond | 100 |
| Heidelberg, Vernon's pond | 100 |
| Hickory, White Oak Pond | 100 |
| Houston, Knox's pond | 100 |
| Jackson, Spring Lake | 100 |
| Willow Pond | 100 |
| Laurel, Park Lake | 150 |
| Liberty, Ball's pond | 100 |
| Lockhart, Harbour's pond | 100 |
| McDonald, Ingram's pond | 100 |
| Macon, Boswell's pond | 150 |
| Eiland's pond | 150 |
| Howard's lake | 125 |
| Stuart's pond | 100 |
| Meridian, Bailey's pond | 100 |
| College Lake | 100 |
| Miller's pond | 200 |
| Suttle's pond | 350 |
| New Albany, Stroud's pond | 100 |
| Nicholson, Gentry's pond | 100 |
| Okolona, Colburn's pond | 200 |
| Quitman, Lake Ruth | 100 |
| McNair's pond | 100 |
| Sessums, Perkins' pond | 100 |
| Sherwood, Norris' pond | 100 |
| Shuqualak, Adams' lake | 150 |
| Wigwam Lake | 150 |
| Strongs, Lake Bolivar | 100 |
| Spring Creek | 100 |
| Williams' pond | 100 |
| Summit, Hillside Pond | 200 |
| Willow Pond | 150 |
| Taylorsville, Robinson's pond | 100 |
| Tishomingo, Holley's lake | 150 |
| Tupelo, Hill's pond | 200 |
| Van Vleet, Arnett Place Pond | 250 |
| Hickory Grove Pond | 100 |
| Waynesboro, Dyess Mill Pond | 100 |
| Oakland Pond | 100 |
| Patten's creek | 100 |
| Taylor's lake | 100 |
| Wilkins Mill Pond | 100 |
| West Point, Dunlap's lake | 400 |
| Ivy's pond | 400 |
| Trout Lake | 100 |
| Whittaker, Whittaker's pond | 150 |
| Yazoo City, Hicks' pond | 100 |
| Missouri: | |
| Arlington, Lukrofka's pond | 400 |
| Conway, Thomas' pond | 200 |
| Marquand, Clubb's pond | 200 |
| Nebraska: | |
| Cheney, Variety Grove Farm Pond | 100 |
| Nevada: | |
| Ely, Olsen's lake | 150 |
| New Mexico: | |
| Deming, Harris's pond | 150 |
| Elida, Mesa Lake | 100 |
| North Carolina: | |
| Aberdeen, Bonnie Brier Pond | 75 |
| Sand Hill Branch Pond | 300 |
| Angier, Matthews' pond | 150 |
| Concord, Clark Creek | 225 |
| Springville Pond | 150 |
| Fayetteville, Pine Lake | 450 |
| Franklinton, Dickerson Mill Pond | 75 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| North Carolina—Continued. | |
| Franklinton, Green Hill Pond | 75 |
| Spring Branch | 75 |
| Whiteside Pond | 75 |
| Williams's ponds | 150 |
| Gastonia, Crawford's pond | 75 |
| Lake Giles | 225 |
| Payes Lake | 150 |
| Spencer's lake | 300 |
| Glen Alpine, Silver Creek Pond | 75 |
| Gold Hill, Second Creek | 150 |
| Graham, Graham Country Club Pond | 225 |
| Guilford College, Ash Pond | 75 |
| Hendersonville, Lake Osceola | 600 |
| Lake West | 300 |
| Rhett's pond | 150 |
| High Point, Willard's pond | 75 |
| Landis, Codle Creek Pond | 75 |
| Landrum, Greenway's pond | 75 |
| Hughes' pond | 150 |
| Lexington, Bock's pond | 175 |
| Hargrave's pond | 75 |
| Liberty, Cane Creek Pond | 75 |
| Thompson's pond | 75 |
| Lilesville, Dockery's pond | 225 |
| Island Creek | 225 |
| Mill Brook, Pineridge Pond | 210 |
| Morgantown, McDowell's pond | 100 |
| Morven, Hamville Pond | 75 |
| Mill Pond | 150 |
| Spring Pond | 150 |
| Pinnacle, Culler's pond | 75 |
| Pittsboro, Four Springs Pond | 225 |
| Hailborne Pond | 75 |
| Petty's pond | 150 |
| Raleigh, Country Club Lake | 300 |
| Lynn's pond | 75 |
| Rockingham, Dog Branch Pond | 75 |
| Ronda, Bugaboo Pond | 150 |
| Little Elkin Pond | 150 |
| Rutherfordton, Broad River Pond | 75 |
| Salisbury, Cauble's pond | 175 |
| Glover's pond | 125 |
| Smithfield, Pou's pond | 150 |
| Southside, Rhyne's pond | 75 |
| Wake Forest, Allen's pond | 75 |
| Bobbitt's pond | 100 |
| Dickson's pond | 100 |
| Harrison's pond | 100 |
| Maltonia Club Pond | 150 |
| Moore's ponds | 300 |
| Spring Pond | 100 |
| Wilbon, Neill's pond | 225 |
| Wilkesboro, Roberson's pond | 75 |
| Winston-Salem, Holton's pond | 75 |
| Youngsville, Alexander's pond | 75 |
| North Dakota: | |
| Devils Lake, Devils Lake | 1,000 |
| Granville, Buffalo Lodge Lake | 300 |
| Oriska, Beyer's pond | 70 |
| St. John, Clear Lake | 300 |
| Hooker's lake | 300 |
| Lake Alexander | 300 |
| Lake Nemo | 300 |
| Waukipa Lake | 300 |
| Ohio: | |
| Ada, Hubbell's pond | 100 |
| Gallipolis, Safford's pond | 100 |
| Hebron, Buckeye Lake | 600 |
| Orbiston, Orbiston Pond | 100 |
| Perry, Shady Nook Pond | 400 |
| Rarden, Taylor's pond | 100 |
| Rossmoyne, Taylor's pond | 100 |
| Sharonville, Schatzle's pond | 100 |
| Tippecanoe City, Kessler's pond | 100 |

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Oklahoma: | |
| Ardmore, City Lake | 300 |
| Dyer Lake | 200 |
| Reed's lake | 100 |
| Santa Fe Lake | 300 |
| Asher, Merrill's pond | 100 |
| Salt Creek Ponds | 125 |
| Doxey, Topper's pond | 100 |
| Elk City, Hughes's lake | 100 |
| Hugo, Wright's pond | 100 |
| Pryor, Miller's pond | 100 |
| Stuart, Coal Creek | 100 |
| Tyrone, Crites's pond | 100 |
| Pennsylvania: | |
| Canonsburg, Neill's pond | 300 |
| Danville, Susquehanna River | 1,250 |
| Hanover, Little Conewago Creek | 150 |
| Huntingdon, Raystown Branch | 200 |
| Icedale, Brandywine Creek | 300 |
| New Bethlehem, Leatherwood Creek | 500 |
| Palm, Hosenack Creek Lake | 200 |
| Perkiomen Creek | 200 |
| Reading, Maiden Creek | 300 |
| Tulpehocken Creek | 300 |
| Shoemakersville, Dreibelbis Creek | 200 |
| Moyer Creek | 200 |
| Temple, Ahren's pond | 200 |
| Bernhart's lake | 200 |
| Weissport, Big Creek | 300 |
| Windber, Ice Company Pond | 200 |
| York, Spring Lake | 100 |
| South Carolina: | |
| Aiken, Bridge Creek Pond | 150 |
| Johnson's pond | 100 |
| Shaw's pond | 100 |
| Thorpe's pond | 100 |
| Belton, Williams's pond | 100 |
| Bethune, Bell Branch Pond | 100 |
| Blacksburg, Parris's pond | 75 |
| Blaney, Crystal Lake | 100 |
| Borden, Pollard Mill Pond | 100 |
| Camden, Boykin's pond | 100 |
| McLeod's pond | 200 |
| Central, Arnold's pond | 50 |
| Holcomb's pond | 50 |
| Chester, Dry Fork Pond | 75 |
| Columbia, Cayce's pond | 200 |
| Gill Creek | 200 |
| Messer's pond | 200 |
| Mill Creek Pond | 200 |
| Poplar Branch Pond | 100 |
| Cope, Fogle's pond | 100 |
| Cordova, Smoak's pond | 75 |
| Fort Mill, Spring Pond | 75 |
| Gaffney, Parker's pond | 75 |
| Turner's pond | 75 |
| Graniteville, Power House Pond | 75 |
| Greenville, Houston's pond | 150 |
| Maple Creek Pond | 75 |
| Greenwood, Logan Branch | 75 |
| Moore Branch Pond | 75 |
| Spring Pond | 75 |
| Hartsville, Beaver Dam Pond | 100 |
| Prestwood Pond | 100 |
| Honea Path, Big Spring Pond | 100 |
| Broadmouth Creek | 175 |
| Kay's pond | 150 |
| Knight's pond | 75 |
| Little River | 100 |
| Johnston, Brimson's pond | 100 |
| Butler's pond | 75 |
| Calhoun's pond | 75 |
| Hilliard's pond | 100 |
| Hollingsworth's pond | 75 |
| Lott's pond | 75 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| South Carolina—Continued. | |
| Johnston, Spring Branch | 75 |
| Ward Creek Pond | 100 |
| Kershaw, Horton's pond | 75 |
| Kinards, Oxner's pond | 75 |
| Lancaster, Steele's pond | 75 |
| Wildcat Pond | 75 |
| Laney, Robeson's pond | 100 |
| Langley, Little Horse Creek Pond | 250 |
| McCormick, Britt's pond | 75 |
| Spring House Pond | 75 |
| Spring Pond | 100 |
| Macedon, Bogy Pond | 100 |
| Newberry, Kings Creek | 100 |
| North Augusta, Big Branch Pond | 100 |
| North, White's pond | 100 |
| Orangeburg, Gue's pond | 50 |
| Pageland, Hicks's pond | 100 |
| Perry, Piney Branch Pond | 125 |
| Pickens, Colony Pond | 50 |
| Oolong Pond | 75 |
| Rock Hill, Mill Pond | 100 |
| Ruby, Oliver's pond | 100 |
| Salley, Branch Pond | 150 |
| Seneca, Langston's pond | 50 |
| Shoals Junction, Dunn's pond | 100 |
| Simpsonville, Rocky Creek Pond | 75 |
| Strother, McMahan's pond | 50 |
| Trenton, Hughes's pond | 100 |
| Horn Creek | 75 |
| Hunt Creek Pond | 100 |
| Marsh's pond | 100 |
| Raus's pond | 75 |
| Shaws Creek Pond | 75 |
| Webb's pond | 75 |
| Union, Buffalo Mill Pond | 100 |
| Municipal Reservoir | 100 |
| Wagner, Dean Swamp Pond | 75 |
| Walhalla, Bauknight's pond | 75 |
| Burley's pond | 75 |
| Oconee pond | 75 |
| Todd's pond | 75 |
| Verner's pond | 75 |
| Willington, Ariail's pond | 75 |
| Covin's pond | 75 |
| Gilbert's pond | 75 |
| Le Roy's pond | 75 |
| Little River | 100 |
| Winnsboro, Creight's pond | 50 |
| Haynes's pond | 75 |
| Woodruff, Chumley's pond | 75 |
| Ferguson Creek | 50 |
| Watson's pond | 75 |
| Yorkville, Smith's pond | 75 |
| South Dakota: | |
| Hitchcock, Cramer's pond | 100 |
| Scenic, Knutson's pond | 425 |
| Tennessee: | |
| Butler, Cable's pond | 175 |
| Concord, Turkey Creek Lake | 200 |
| Cookeville, Clause's pond | 225 |
| Cumberland Gap, Holly Hill Pond | 200 |
| Lambert's pond | 200 |
| Johnson City, Aspen Bower Lake | 500 |
| Knoxville, Little River | 75 |
| Maryville, Housholder's pond | 200 |
| Tate Springs, Kirkham's pond | 75 |
| Tate Springs Reservoir | 150 |
| Wautauga Point, Buffalo Creek | 500 |
| Whitesburg, Shields's pond | 75 |
| Texas: | |
| Amarillo, Famous Heights Park Lake | 50 |
| Big Springs, Davis's pond | 35 |
| Fisher's pond | 35 |
| Blum, Klondike Lake | 100 |

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Texas—Continued. | 75 |
| Brady, Lime Oak Creek | |
| Brazos, Blucher's pond | 30 |
| Carbon, Pierce's pond | 30 |
| Carthage, Hill's lakes | 50 |
| Cisco, Lake Borine | 100 |
| Clifton, Manske's pond | 50 |
| Comanche, Highland Lake | 25 |
| De Leon, Spring Pond | 100 |
| Elkhart, Elkhart Lake | 200 |
| Eskota, Kurth's pond | 50 |
| Fort Worth, Davie Burns Lake | 50 |
| Friona, Mayflower Pond | 30 |
| Gorman, King's pond | 60 |
| Lusk's pond | 30 |
| Gordon, Chenault's pond | 50 |
| Horlin's pond | 30 |
| Graham, Oak Grove Pond | 20 |
| Grand Saline, Brown's pond | 30 |
| Jacksonville, Belva Lake | 200 |
| Kaufman, Hoffer Pond | 30 |
| Kemp, Trinity Lake | 100 |
| Lindale, Mill Creek Pond | 100 |
| Llano, Doel's pond | 40 |
| Lytle, Carter's pond | 30 |
| Mabank, Grubb's pond | 30 |
| Manor, Johnson's reservoir | 20 |
| Marlin, Clark's pond | 50 |
| Marshall, Lake Ferns | 300 |
| Lake Katrine | 50 |
| Walker's lake | 50 |
| Merkel, Count's pond | 30 |
| Nacogdoches, Mamie Ross Lake | 300 |
| Rockdale, Coffield's pond | 100 |
| Randle's lake | 40 |
| Rotan, Hunter's pond | 130 |
| Saginaw, Beall's pond | 50 |
| Santo, Miller's pond | 50 |
| Terrell, McCord's pond | 25 |
| Renfro Creek Lake | 25 |
| Toyah, Humphries's pond | 50 |
| Tuxedo, Davis's lake | 100 |
| Tye, Worthington Lake | 40 |
| Tyler, Country Club Lake | 200 |
| Lake Park | 200 |
| Lake Wood | 200 |
| Walnut Springs, Smitham's lake | 100 |
| Wichita, Railroad Pond | 60 |
| Winnsboro, Baker's pond | 20 |
| Spring Lake | 150 |
| Virginia: | |
| Bealeton, Old Gum Spring Pond | 150 |
| Beaver Dam, Thompson's pond | 125 |
| Belmont Park, Goose Creek | 350 |
| Charlottesville, New Reservoir | 225 |
| Cumberland, Burleighhall Pond | 125 |
| Dillwyn, Fitzgerald's pond | 125 |
| Disputanta, Belsches's pond | 125 |
| Drewrys Bluff, Spring Lake | 125 |
| Dungamon, Kilgore's pond | 450 |
| East Lexington, North River Pond | 400 |
| Evington, Irvine's pond | 200 |
| Farmville, Agee's pond | 250 |
| Gladys, Maple Pond | 200 |
| Gordonsville, Oak Hill Pond | 400 |
| Orange, Mill Creek Pond | 125 |
| Pennington Gap, Hickory Flats Pond | 200 |
| Petersburg, Belscher's pond | 400 |
| Shipman, Mountain Pond | 125 |
| Spout Springs, Poplar Pond | 150 |
| Staunton, Gypsy Hill Lake | 125 |
| Troutville, Alderson's pond | 150 |
| Troy, Poplar Grove Pond | 125 |
| Winton, Brown's pond | 200 |
| Warrenton, Cedar Run | 100 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

SUNFISH (BREAM)—Continued.

| Disposition. | Fingerlings, yearlings, and adults. | Disposition. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Virginia—Continued. | | Wisconsin—Continued. | |
| Warrenton, Forest Branch Pond | 150 | Independence, New City Pond | 200 |
| Washington: | | La Crosse, Mississippi River | 21,468 |
| Oroville, Lemonosky Lake | 300 | Muscoda, Mill Creek Pond | 300 |
| West Virginia: | | Prairie du Chien, Mississippi River | 58,250 |
| Bedington, Emerson's pond | 500 | Victory, Mississippi River | 1,666 |
| Weston, Walnut Fork Pond | 200 | Wyoming: | |
| Wisconsin: | | Sheridan, Cut-Off Pond | 150 |
| Genoa, Mississippi River | 4,166 | | |
| Independence, Bugle Lake | 300 | Total[a] | 342,825 |

[a] Lost in transit, 2,810 fingerlings.

PIKE PERCH.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Arkansas: | | | |
| Des Arc, Caloutchie Bay | | 50,000 | |
| Elkins, White River | | 400,000 | |
| Helena, Mississippi River | | | 800 |
| Connecticut: | | | |
| Wallingford, Lake Quonnipaug | | 500,000 | |
| Illinois: | | | |
| Havana, Illinois State Fish Commission | 8,000,000 | | |
| Meredosia, Illinois River | | 930,000 | |
| Momence, Kankakee River | | 1,260,000 | |
| Wilmington, Kankakee River | | 1,260,000 | |
| Indiana: | | | |
| Angola, Buck Lake | | 800,000 | |
| Fox Lake | | 1,000,000 | |
| Columbia City, Shriner Lake | | 1,200,000 | |
| Leesburg, Shoe Lake | | 1,000,000 | |
| Monticello, Tippecanoe River | | 1,500,000 | |
| Rome City, Sylvan Lake | | 1,500,000 | |
| Iowa: | | | |
| Clear Lake, Clear Lake | | 750,000 | |
| Estherville, Des Moines River, West Branch | | 600,000 | |
| Manchester, Maquoketa River | | 300,000 | |
| Orleans, East Okeboji Lake | | 400,000 | |
| Spirit Lake | | 400,000 | |
| Ruthven, Lost Island Lake | | 400,000 | |
| Waterloo, Cedar River | | 250,000 | |
| West Liberty, Cedar River | | 200,000 | |
| Kansas: | | | |
| Marion, Cottonwood River | | 400,000 | |
| Kentucky: | | | |
| Hopkinsville, Waterworks Lake | | 800,000 | |
| Lebanon, Beech Fork River | | 1,500,000 | |
| Cartwright Creek | | 800,000 | |
| Lloyds Creek | | 800,000 | |
| North Fork Creek | | 1,000,000 | |
| Pitman Creek | | 1,000,000 | |
| Popes Creek | | 800,000 | |
| Rolling Fork River | | 1,500,000 | |
| South Fork Creek | | 1,000,000 | |
| Massachusetts: | | | |
| Falmouth, Shivericks Pond | | 400,000 | |
| Greenfield, Connecticut River | | 1,000,000 | |
| Deerfield River | | 800,000 | |
| Pittsfield, Pontosuc Lake | | 500,000 | |
| Shelburne Falls, Deerfield River | | 600,000 | |
| Waltham, Nonsuch Pond | | 500,000 | |
| Michigan: | | | |
| Alpena, Long Lake | | 1,200,000 | |
| Bay City, Saginaw Bay | | 4,500,000 | |
| Birmingham, Wing Lake | | 500,000 | |
| Crystal Falls, Mary Lake | | 540,000 | |
| Detroit, Michigan Fish Commission | 34,280,000 | | |
| Edwardsburg, Eagle Lake | | 975,000 | |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

PIKE PERCH—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Michigan—Continued. | | | |
| Hale Lake, Hale Lake | | 500,000 | |
| Loon Lake | | 800,000 | |
| Lincoln, Brownlee Lake | | 600,000 | |
| Millersburg, Barnhart Lakes | | 800,000 | |
| Paw Paw, Maple Lake | | 1,000,000 | |
| St. Joseph, Lake Chapin | | 1,200,000 | |
| Witch Lake, Horse Shoe Lake | | 360,000 | |
| Minnesota: | | | |
| Alexandria, Lake Geneva | | 540,000 | |
| Big Lake, Big Lake | | 500,000 | |
| Brownsville, Mississippi River | | | 1,730 |
| Chub Lake, Chub Lake | | 400,000 | |
| Hanging Horn Lake, Hanging Horn Lake | | 600,000 | |
| Mankato, Lake Washington | | 720,000 | |
| Missouri: | | | |
| Crocker, Gasconade River | | 400,000 | |
| Roubidoux Creek | | 400,000 | |
| St. Joseph, Missouri Fish Commission | 2,000,000 | | |
| New Hampshire: | | | |
| Mountainview, Ossipee Lake | | 1,000,000 | |
| Winchester, Forest Lake | | 500,000 | |
| New Jersey: | | | |
| Boonton, Rockaway River | | 700,000 | |
| New York: | | | |
| Addison, Canister River | | 600,000 | |
| Bliss, Eagle Lake | | 600,000 | |
| Lisle, Tioughnioga River | | 400,000 | |
| North Dakota: | | | |
| Cando State Fish Commission | 10,000,000 | | |
| Ohio: | | | |
| Columbus, Scioto River | | 1,000,000 | |
| Fremont, Sandusky River | | 1,000,000 | |
| Holliers Beach, Lake Erie | | 16,000,000 | |
| Isle St. George, Lake Erie | | 16,000,000 | |
| Lima, Lima Lake | | 1,000,000 | |
| Port Clinton, Lake Erie | | 475,000 | |
| Put-in Bay, Lake Erie | | 20,000,000 | |
| Ohio State Commission | 170,725,000 | | |
| Toledo, Lake Erie | | 10,000,000 | |
| Upper Sandusky, Upper Sandusky River | | 1,500,000 | |
| Oklahoma: | | | |
| Tahlequah, Illinois River | | 400,000 | |
| Pennsylvania: | | | |
| Bushkill, Delaware River | | 800,000 | |
| Coolbaugh, Echo Lake | | 600,000 | |
| Erie, Pennsylvania Fish Commission | 96,450,000 | | |
| Factoryville, Lake Kewanna | | 700,000 | |
| Goldsboro, Susquehanna River | | 500,000 | |
| Huntingdon, Raystown Branch | | 700,000 | |
| New Freedom, Clipper Dam | | 300,000 | |
| New Milford, Upper Lake | | 700,000 | |
| Spruce Hill, Tuscarora Creek | | 500,000 | |
| Susquehanna, Page Pond | | 800,000 | |
| Susquehanna River | | 800,000 | |
| Vicksburg, Armstrong Run | | 200,000 | |
| Wilkes-Barre, Nuangola Lake | | 1,000,000 | |
| Wrightsville, Susquehanna River | | 500,000 | |
| York Haven, Susquehanna River | | 500,000 | |
| South Dakota: | | | |
| Langford, Ninemile Lake | | 800,000 | |
| Sixmile Lake | | 800,000 | |
| Tennessee: | | | |
| Springfield, Milldale Pond | | 800,000 | |
| Vermont: | | | |
| Boltonville, Tickle Necked Pond | | 600,000 | |
| Ludlow, Plymouth Pond | | 800,000 | |
| Miles Pond, Miles Pond | | 800,000 | |
| Swanton, Lake Champlain | | 11,000,000 | |
| West Danville, Joe's pond | | 1,000,000 | |
| Virginia: | | | |
| Wytheville, Reed Creek | | 1,000,000 | |
| West Virginia: | | | |
| Fairmont, Tygarts Valley River | | 500,000 | |
| Morgantown, Cheat River | | 800,000 | |
| Wisconsin: | | | |
| Antigo, Edith Lake | | 400,000 | |
| Barronette, Deep Lake | | 500,000 | |

## Details of Distribution of Fish and Fish Eggs—Continued.

### PIKE PERCH—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Wisconsin—Continued. | | | |
| Cable, Namekagon Lake | | 800,000 | |
| Colgate, Lake Five | | 500,000 | |
| Crandon, Oak Lake | | 800,000 | |
| Genoa, Mississippi River | | | 416 |
| Gordon, Bass Lake | | 400,000 | |
| Clear Lake | | 400,000 | |
| Wagner Lake | | 400,000 | |
| Greenwood, Popple River | | 600,000 | |
| Hancock, Fish Lake | | 400,000 | |
| Haugen, Pokagama Lake | | 500,000 | |
| Iron River, Lower Pike Lake | | 720,000 | |
| Kewaunee Kewaunee River | | 450,000 | |
| La Crosse, Mississippi River | | | 2,148 |
| Nashville, Dry Lake | | 600,000 | |
| Okauchee, Okauchee Lake | | 2,500,000 | |
| Stone Lake, Whitefish Lake | | 400,000 | |
| Victory, Mississippi River | | | 166 |
| Wonewoc, Baraboo River | | 800,000 | |
| Total[a] | 321,455,000 | 154,480,000 | 5,260 |

### YELLOW PERCH.

| | | | |
|---|---|---|---|
| Colorado: | | | |
| La Jara, Laguna Escondida | | | 200 |
| Connecticut: | | | |
| Hadlyme, State Fish Commission | 5,200,000 | | |
| Delaware: | | | |
| Wilmington, Brandywine Creek | | 800,000 | |
| Illinois: | | | |
| Carbondale, Horse Shoe Lake | | | 200 |
| Chicago, Armour's pond | | | 900 |
| Otis's pond | | | 900 |
| Eckerts, Deich's pond | | | 100 |
| Irving, Funk's lake | | | 500 |
| Millstadt, Grossman's pond | | | 300 |
| Shipman, Olmsted's pond | | | 400 |
| Indiana: | | | |
| Angola, Walled Lake | | | 200 |
| Centerville, Kitterman's pond | | | 90 |
| Edinburg, White River, East Fork | | | 200 |
| Lake Cicott, Lake Cicott | | | 300 |
| Lebanon, Saltmarsh Pond | | | 75 |
| Silver Lake, Silver Lake | | | 200 |
| Winchester, Summers's pond | | | 100 |
| Iowa: | | | |
| Lime Springs, Upper Iowa River | | | 20 |
| McGregor, Lake Como | | | 900 |
| North McGregor, Mississippi River | | | 42,750 |
| Kansas: | | | |
| Pittsburg, Gibson Pond | | | 100 |
| Kentucky: | | | |
| Cropper, Dunavent's pond | | | 100 |
| Pollard's pond | | | 100 |
| Louisville, Lake Lansdowne | | | 300 |
| Park View Lake | | | 100 |
| Woodbine, Lake Placid | | | 300 |
| Maryland: | | | |
| Accokeek Creek, Potomac River | | 66,117,500 | |
| Baltimore, Patapsco River Pond | | | 150 |
| Bryans Point, Potomac River | | 10,945,000 | |
| Bush River, Bush River | | 2,400,000 | |
| Cecil, Chesapeake Bay | | 23,600,000 | |
| Chase, Dundee River | | 600,000 | |
| Freeland, South Lake | | | 300 |
| Gunpowder, Gunpowder River | | 2,200,000 | |
| Harford, Swan Creek | | 9,500,000 | |
| Harmony Grove, Richfield Pond | | 200,000 | |
| Havre de Grace, Chesapeake Bay | | 12,600,000 | |
| Pamunkey Creek, Potomac River | | 10,985,000 | |
| Piscataway Creek, Potomac River | | 64,887,500 | |
| Principio, Chesapeake Bay | | 15,000,000 | |

[a] Lost in transit, 545,000 fry.

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

YELLOW PERCH—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| Maryland—Continued. | | | |
| Swan Creek, Potomac River | | 5,915,000 | |
| Town Point, Elk River | | 41,000,000 | |
| Waterbury, Old Place Creek | | 400,000 | |
| Massachusetts: | | | |
| Merrimac, Sargent's pond | | 400,000 | |
| Michigan: | | | |
| Alpena, Lake Esau | | | 400 |
| Minnesota: | | | |
| Brownsville, Mississippi River | | | 4,000 |
| Rochester, Zumbro Mill Pond | | | 200 |
| Missouri: | | | |
| St. Charles, Crystal Lake | | | 100 |
| New Hampshire: | | | |
| Meredith, Long Pond | | 400,000 | |
| New Jersey: | | | |
| Hammonton, Hammonton Lake | | 800,000 | |
| Netcong, Bear Pond | | | 200 |
| Pompton Lakes, Pompton Lakes | | 1,000,000 | |
| Pompton River | | 1,000,000 | |
| Red Bank, Shrewsbury Pond | | 200,000 | |
| New Mexico: | | | |
| Colfax, Adams Lake | | | 219 |
| New York: | | | |
| Auburn, Owasco Lake | | | 2,000 |
| Fallsburg, Ruddick Pond | | 600,000 | |
| Flushing, Iron Spring Lake | | | 150 |
| Middleton, Ketchens Pond | | 600,000 | |
| Summit Lake | | 400,000 | |
| Millers Place, Hopkins Pond | | 200,000 | |
| Mohonk Lake, Mohonk Reservoir | | 200,000 | |
| Monroe, Monobasha Lake | | 600,000 | |
| Round Island Lake | | 600,000 | |
| Walton Lake | | 600,000 | |
| North Carolina: | | | |
| Hendersonville, Tulip Pond | | | 60 |
| Lexington, Hankins' pond | | | 100 |
| Nokomis Mill Pond | | | 100 |
| Sandy Creek Pond | | | 100 |
| Salisbury, Cooleemee Pond | | | 100 |
| Miller's pond | | | 100 |
| Second Creek | | | 100 |
| Statesville, Buffalo Shoal Pond | | | 100 |
| North Dakota: | | | |
| Devils Lake, Devils Lake | | | 1,000 |
| Lisbon, Mulinex's pond | | | 200 |
| Milnor, Star Pond | | | 175 |
| Ohio: | | | |
| Marion, Scioto River | | | 70 |
| Oklahoma: | | | |
| Devol, Suter's pond | | | 70 |
| El Reno, Carter's pond | | | 75 |
| McAlester, Cole's lake | | | 50 |
| Marietta, Love's lake | | | 100 |
| Ochelata, Upper Pond | | | 150 |
| Oklahoma City, Lake View Lake | | | 250 |
| Pennsylvania: | | | |
| Bedford, Dunning Creek | | | 120 |
| Raystown Branch | | | 120 |
| Bunkney, Susquehanna River | | 600,000 | |
| Danville, Susquehanna River | | | 425 |
| Devon, Eldonridge Pond | | 200,000 | |
| Dushore, Headley Pond | | 600,000 | |
| Housingers Pond | | 400,000 | |
| Mill Pond | | | 125 |
| Factoryville, Gardners Pond | | 600,000 | |
| Freeport, Briar Patch Pond | | | 100 |
| Greenville, Shenango River | | | 325 |
| Honey Brook, Mackelduff Pond | | 400,000 | |
| Indiana, Crooked Creek | | | 150 |
| Ledys, Big Pond | | | 150 |
| Lenape, Brandywine River | | 1,000,000 | |
| New Freedom, Smith Ponds | | | 300 |
| Sheridan, Tulpehocken Creek | | 600,000 | |
| Waltersburg, Big Redstone Pond | | | 100 |
| South Carolina: | | | |
| Calhoun, Twenty-three Mile Creek | | | 120 |
| Denmark, Savannah Lake | | | 180 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

YELLOW PERCH—Continued.

| Disposition. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
|---|---|---|---|
| South Carolina—Continued. | | | |
| Gaffney, Sarratt's pond | | | 60 |
| Greenville, Greenville Lake | | | 120 |
| Trenton, Horse Creek Pond | | | 60 |
| Troy, Spring Branch | | | 60 |
| South Dakota: | | | |
| Madison, Lake Herman | | | 600 |
| Vermont: | | | |
| Brattleboro, West River | | 300,000 | |
| Lyndonville, Chandler Pond | | 600,000 | |
| Bean Pond | | 400,000 | |
| Poultney, Lake St. Catherine | | 500,000 | |
| St. Johnsbury, Passumpsic River | | | 1,445 |
| Walden, Coles Pond | | 800,000 | |
| Virginia: | | | |
| Boyce, Shenandoah River | | 2,000,000 | |
| Charlottesville, Maury's pond | | | 125 |
| Danville, Maple Grove Pond | | | 200 |
| Dinwiddie, Cat Tail Pond | | 300,000 | |
| Dogue Creek, Potomac River | | 26,680,000 | |
| Little Hunting Creek, Potomac River | | 4,550,060 | |
| Pohick Creek, Potomac River | | 10,205,000 | |
| Rockfish, Hardwick Lake | | 400,000 | |
| Rockfish Lake | | | 250 |
| Scottsville, Spring Pond | | | 100 |
| Washington: | | | |
| Tacoma, American and Gravelly Lakes | | | 500 |
| West Virginia: | | | |
| Milton, Newman Springs | | | 100 |
| Rippon, Bull Shin Creek | | 1,000,000 | |
| Wisconsin: | | | |
| Elkhart, Elkhart Lake | | | 300 |
| La Crosse, Mississippi River | | | 4,000 |
| Lake Mills, Rock Lake | | | 600 |
| Prairie du Chien, Mississippi River | | | 37,750 |
| Total[a] | 5,200,000 | 326,885,000 | 108,439 |

[a] Lost in transit, 856 fingerlings.

STRIPED BASS.

| Disposition. | Eggs. | Fry. |
|---|---|---|
| Maryland: | | |
| Havre de Grace, Chesapeake Bay | | 115,000 |
| North Carolina: | | |
| Weldon, Roanoke River | 4,566,000 | 2,669,000 |
| Total | 4,566,000 | 2,784,000 |

WHITE BASS.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Arkansas: | |
| Helena, Mississippi River | 5,950 |
| Wisconsin: | |
| Genoa, Mississippi River | 34 |
| LaCrosse, Mississippi River | 33 |
| Victory, Mississippi River | 33 |
| Total | 6,050 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

WHITE PERCH.

| Disposition. | Eggs. | Fry. |
|---|---|---|
| Connecticut: | | |
| Seymour, Hemp Swamp Pond | | 400,000 |
| Delaware: | | |
| Nassau, Red Mill Pond | | 2,400,000 |
| Wilmington, Brandywine Creek | | 800,000 |
| Maryland: | | |
| Bush River Station, Bush River | | 2,000,000 |
| Chase, Dundee Creek | | 4,000,000 |
| Havre de Grace, Chesapeake Bay | | 122,450,000 |
| Elk River | | 18,250,000 |
| Susquehanna River | | 66,800,000 |
| Hendersons Point, Elk River | | 32,555,000 |
| Locust Point, Chesapeake Bay | | 5,150,000 |
| Swan Creek, Chesapeake Bay | | 17,100,000 |
| Town Point, Elk River | | 37,750,000 |
| Wild Duck Harbor, Susquehanna River | | 20,825,000 |
| Massachusetts: | | |
| Gardner, Stoddard Meadow Pond | | 400,000 |
| Tilton Pond | | 400,000 |
| Whitman Pond | | 400,000 |
| Leominster, Spectacle Pond | | 800,000 |
| South Sudbury, Bright's pond | | 400,000 |
| New Hampshire: | | |
| Baboosic, Baboosic Lake | | 800,000 |
| Raymond, Pawtuckaway Lake | | 400,000 |
| Winchester, Forest Lake | | 600,000 |
| New Jersey: | | |
| Boonton, Dixson Pond | | 600,000 |
| New York: | | |
| Albany, Forest, Fish and Game Commission | 15,000,000 | |
| Lake Waccabuc, Waccabuc Lake | | 800,000 |
| Lewisboro, Trinity Lake | | 600,000 |
| Middletown, Hennessey Lake | | 600,000 |
| New York, New York Aquarium | 1,500,000 | |
| Pennsylvania: | | |
| Annville, Quittapahilla Creek | | 400,000 |
| Vermont: | | |
| Montpelier, Groton Lake | | 800,000 |
| Total | 16,500,000 | 338,480,000 |

YELLOW BASS.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Arkansas: | |
| Helena, Mississippi River | 250 |

SEA BASS.

| Disposition. | Fry. |
|---|---|
| Massachusetts: | |
| Falmouth, Buzzards Bay | 253,000 |
| Quissett Harbor | 555,000 |
| Total | 808,000 |

MACKEREL.

| | |
|---|---|
| Massachusetts: | |
| Falmouth, Buzzards Bay | 388,000 |
| Great Harbor | 338,000 |
| Gosnold, Vineyard Sound | 38,000 |
| Total | 764,000 |

DETAILS OF DISTRIBUTION OF FISH AND FISH EGGS—Continued.

FRESHWATER DRUM.

| Disposition. | Fingerlings, yearlings, and adults. |
|---|---|
| Arkansas: | |
| Helena, Mississippi River | 8,950 |
| Iowa: | |
| North McGregor, Mississippi River | 1,500 |
| Wisconsin: | |
| Prairie du Chien, Mississippi River | 1,500 |
| Total | 11,950 |

COD.

| Disposition. | Eggs. | Fry. |
|---|---|---|
| Maine: | | |
| Boothbay Harbor, Boothbay Harbor | | 6,310,000 |
| Kinekins Bay | | 4,304,000 |
| Cape Elizabeth, Casco Bay | | 4,274,000 |
| Massachusetts: | | |
| Beverly, Massachusetts Bay | | 38,658,000 |
| Falmouth, Buzzards Bay | | 9,733,000 |
| Gloucester, Atlantic Ocean | 9,854,000 | 22,510,000 |
| Ipswich Bay | | 29,060,000 |
| Massachusetts Bay | | 9,305,000 |
| Gosnold, Buzzards Bay | | 5,979,000 |
| Vineyard Sound | | 44,423,000 |
| Great Harbor, Vineyard Sound | | 163,000 |
| Manchester, Massachusetts Bay | | 4,630,000 |
| Marblehead, Massachusetts Bay | | 2,580,000 |
| Provincetown, Provincetown Harbor | | 862,000 |
| Rockport, Atlantic Ocean | | 18,250,000 |
| Ipswich Bay | | 9,060,000 |
| Woods Hole, Eel Pond | | 253,000 |
| Total | 9,854,000 | 210,354,000 |

HADDOCK.

| Disposition. | Fry. |
|---|---|
| Maine: | |
| Boothbay Harbor, Boothbay Harbor | 712,000 |

POLLOCK.

| Disposition. | Fry. | Disposition. | Fry. |
|---|---|---|---|
| Massachusetts: | | Massachusetts—Continued. | |
| Beverly, Massachusetts Bay | 1,330,000 | Manchester, Massachusetts Bay | 14,510,000 |
| Gloucester, Atlantic Ocean | 12,400,000 | Rockport, Atlantic Ocean | 5,800,000 |
| Ipswich Bay | 1,180,000 | | |
| Massachusetts Bay | 2,920,000 | Total | 38,140,000 |

## Details of Distribution of Fish and Fish Eggs—Continued.

### FLATFISH.

| Disposition. | Fry. |
|---|---|
| **Maine:** | |
| Boothbay Harbor, Boothbay Harbor | 380,176,000 |
| Linekin Bay | 4,591,000 |
| Mill Cove | 17,398,000 |
| **Massachusetts:** | |
| Beverly, Massachusetts Bay | 18,210,000 |
| Falmouth, Buzzards Bay | 11,156,000 |
| Great Harbor | 6,138,000 |
| Little Harbor | 2,047,000 |
| Quissett Harbor | 6,579,000 |
| Gloucester, Annisquam River | 111,170,000 |
| Gloucester Harbor | 109,540,000 |
| Ipswich Bay | 7,800,000 |
| Gosnold, Buzzards Bay | 21,783,000 |
| Hadley Harbor | 17,264,000 |
| Lackey Bay | 12,328,000 |
| Robinson Hole | 7,063,000 |
| Tarpaulin Cove | 17,006,000 |
| Vineyard Sound | 18,810,000 |
| **Massachusetts—Continued.** | |
| Manchester, Massachusetts Bay | 61,020,000 |
| Monument Beach, Monument Beach Harbor | 5,751,000 |
| Provincetown, Provincetown Harbor | 4,678,000 |
| Quissett, Quissett Harbor | 7,797,000 |
| Rockport, Rockport Harbor | 5,080,000 |
| Waquoit, Waquoit Bay | 23,655,000 |
| Wareham, Wareham River | 4,142,000 |
| Woods Hole, Great Harbor | 11,661,000 |
| Woods Hole Harbor | 6,090,000 |
| **Rhode Island:** | |
| East Greenwich, East Greenwich Bay | 12,134,000 |
| Newport, Narragansett Bay | 13,254,000 |
| Wickford, Wickford Harbor | 6,434,000 |
| Total | 930,755,000 |

### LOBSTERS.

| Disposition. | Fry. |
|---|---|
| **Maine:** | |
| Biddeford Pool, Biddeford Pool Harbor | 10,000,000 |
| Wood Isle Harbor | 2,000,000 |
| Boothbay Harbor, Boothbay Harbor | 6,000,000 |
| Bristol, Johns Bay | 3,000,000 |
| Brooklin, Naskeg Harbor | 250,000 |
| Camden, Camden Harbor | 1,000,000 |
| Cape Porpoise, Cape Porpoise Harbor | 4,500,000 |
| Damariscotta, Damariscotta River | 500,000 |
| Deer Isle, Eggemoggin Reach | 500,000 |
| Southwest Harbor | 400,000 |
| East Boothbay, Linekin Bay | 1,000,000 |
| Eastport, Broad Cove | 5,250,000 |
| Falmouth, Casco Bay | 4,000,000 |
| Frenchboro, Frenchboro Harbor | 500,000 |
| Long Isle Harbor | 1,500,000 |
| Friendship, Friendship Harbor | 3,500,000 |
| Isleboro, Penobscot Bay | 400,000 |
| Isleford, Isleford Harbor | 1,500,000 |
| Isle of Shoals, Gulf of Maine | 1,600,000 |
| Isle of Shoals Harbor | 1,000,000 |
| Piscataqua River | 400,000 |
| Jonesport, Roque Isle Harbor | 650,000 |
| Kennebunk, Kennebunk Port Harbor | 500,000 |
| Wells Bay | 500,000 |
| Kittery Point, Pepperals Cove | 1,500,000 |
| Little Deer Isle, Billings Cove | 200,000 |
| Lowry, Delanos Cove | 3,000,000 |
| Milbridge, Pigeon Hill Bay | 2,000,000 |
| Mount Desert, Bass Harbor | 1,000,000 |
| Southwest Harbor | 500,000 |
| New Harbor, New Harbor | 3,500,000 |
| North Haven, North Haven Harbor | 1,500,000 |
| Pulpit Harbor | 1,000,000 |
| Orrs Island, Lowells Cove | 500,000 |
| Pemaquid, Pemaquid Harbor | 3,500,000 |
| Port Clyde, Port Clyde Harbor | 1,000,000 |
| Portland, Casco Bay | 5,000,000 |
| Peaks Isle Roads | 3,500,000 |
| Portland Harbor | 2,500,000 |
| Prospect Harbor, Bunkers Harbor | 3,000,000 |
| Dyers Bay | 12,000,000 |
| Rockland, Rockland Harbor | 3,000,000 |
| Rockport, Rockport Harbor | 1,000,000 |
| Small Point, Horse Isle Harbor | 500,000 |
| Small Point Harbor | 2,106,000 |
| **Maine—Continued.** | |
| South Addison, Pleasant Bay | 250,000 |
| South Hancock, Skillings River | 2,000,000 |
| Southport, Atlantic Ocean | 4,500,000 |
| Cape Harbor | 1,500,000 |
| Deckers Cove | 1,500,000 |
| Ebencook Harbor | 500,000 |
| St. George, Martins Harbor | 1,000,000 |
| Stonington, Stonington Harbor | 500,000 |
| Surry, Union Bay | 250,000 |
| Swan Isle, Old Harbor | 500,000 |
| Tennants Harbor, Owls Head Bay | 1,000,000 |
| Vinal Haven, Vinal Haven Harbor | 3,000,000 |
| Wells, Wells Bay | 500,000 |
| West Lubec, Grand Manan Channel | 350,000 |
| Winnegance, New Meadows River | 1,500,000 |
| Winter Harbor, Winter Harbor | 500,000 |
| York, York Harbor | 4,500,000 |
| **Massachusetts:** | |
| Bakers Island, Massachusetts Bay | 300,000 |
| Beverly, Massachusetts Bay | 1,400,000 |
| Boston, Boston Bay | 3,700,000 |
| Cohassett, Massachusetts Bay | 834,000 |
| Falmouth, Buzzards Bay | 493,000 |
| Quissett Harbor | 874,000 |
| Vineyard Sound | 341,000 |
| Gloucester, Atlantic Ocean | 2,800,000 |
| Gloucester Harbor | 600,000 |
| Ipswich Bay | 500,000 |
| Gosnold, Buzzards Bay | 2,721,000 |
| Cuttyhunk Harbor | 1,087,000 |
| Hadley Harbor | 827,000 |
| Lackeys Bay | 2,868,000 |
| Vineyard Sound | 6,165,000 |
| Lanesville, Ipswich Bay | 1,100,000 |
| Manchester, Massachusetts Bay | 2,800,000 |
| Marblehead, Boston Bay | 300,000 |
| Rockport, Atlantic Ocean | 600,000 |
| Rockport Harbor | 600,000 |
| Swampscott Harbor, Massachusetts Bay | 200,000 |
| Woods Hole, Coles Pond | 192,000 |
| Great Harbor | 1,097,600 |
| **New Hampshire:** | |
| Stratford, Little New Harbor | 4,000,000 |
| **Oregon:** | |
| Yaquina, Yaquina Bay | [a] 1,532 |
| Total | 162,505,000 |

[a] Adults, of which 520 were lost in transit.

# DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES STEAMER ALBATROSS DURING THE PHILIPPINE EXPEDITION, 1907–1910

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Bureau of Fisheries Document No. 741

# DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES STEAMER ALBATROSS DURING THE PHILIPPINE EXPEDITION, 1907–1910.

The Philippine cruise of the *Albatross* covered a greater period of time than any single expedition previously undertaken by that vessel. The ship left San Francisco October 16, 1907, and, sailing by way of the Hawaiian Islands, Midway, and Guam, arrived at Manila November 28. The stop at Midway, occasioned by a requisition of the vessel to carry stores from Honolulu to the United States marines stationed on Midway, was made the opportunity to take a small collection of the reef fishes and shore fauna of that group of islands. The number of fishes was very small, owing to the inability to carry enough explosive to do effective work, only 10 pounds of dynamite being allowed for use here and at Guam. Small collections were similarly made at this latter place when the ship stopped there for coal.

A two months' delay in the arrival of the stores which had been shipped from New York direct to Manila limited the vessel's activity for that period to the immediate vicinity of Manila. Thereafter the work was done by a series of short cruises made to the different parts of the Archipelago with Manila as a base for supplies and the deposit of collections.

During the period between February 2 and June 9, 1908, cruises were made to the southward, the first along the southwest side of Mindanao, thence through the Sulu groups, extending as far as Sandakan, Borneo; the second through the central group, including Panay, Negros, Cebu, Leyte, Masbate, and Marinduque; the third about the east and southeast coasts of Mindanao.

After the return to Manila from the last of these cruises it had become apparent that the *Albatross* required extensive repairs, and in August the ship left for Hongkong to have these made. Upon conclusion of this work in October Pratas Reef was visited and a number of soundings and trawl hauls were later made in the China Sea between that reef and the Batan Islands. Some work was done in the Batan and Babuyan islands and on the northern end of Luzon. Contemplated stops along the northwesterly coast of Luzon were prevented by bad weather which culminated in a typhoon.

During December, 1908, and January, 1909, a cruise through the Calamianes and the western and southern regions of Palawan was completed, touching on the return trip at Sandakan, Cagayan Sulu, and Iloilo. Late in January and early in February a number of cod trawl sets were made in the vicinity of Mariveles, but with indifferent success. The succeeding month was spent along the southern coasts of Luzon and adjacent islands, continuing thence southerly along the small islands to Bohol, thence westerly by the Cagayanes to the east coast of Palawan and northward into the Cuyos, returning to Manila early in April.

After a short trip to Lingayen Gulf early in May, the ship cruised along the small islands north of Samar and on the southeast coast of Luzon as far as Maculabo Island above San Miguel Bay, returning to Manila late in June. The latter part of July and all of August and September were spent in cruising from the southern coast of Samar, along southeastern Leyte, thence along the northern coast of Mindanao as far as Dapitan, thence northerly to Cebu, where some time was lost in repairing the boilers. The latter part of the period was consumed in further work in the vicinity of Zamboanga and along the Sulu group as far as Borneo, touching at a few small islands adjacent to the Borneo coast. Early in November the ship undertook a supplementary trip through the Dutch East Indies, touching at Menado, Ternate, Amboina, and Macassar, as well as at many intermediate points. On this trip a number of trawl hauls were made, including some exploration of the waters of the gulfs of Tomini and Boni in Celebes.

The homeward trip from Manila was begun January 21, 1910. Bad weather and other difficulties prevented the execution of orders to continue the work in the vicinity of Formosa and the Loo Choo Islands; at only two stops in Formosa were any collections made. After further repairs to the vessel in Japan, sail was set for the United States and San Francisco was reached May 4, 1910, after an absence of over two and one-half years.

## EXPLANATION OF TABLES.

The last previous dredging station of the *Albatross* was no. 5095, the last hydrographic station was no. 4896, occupied during the northwestern Pacific cruise of 1906. (See Bureau of Fisheries Document 621.) Five hundred and seventy-seven dredging and 41 hydrographic stations were occupied during the Philippine expedition, extending the series of dredging stations to no. 5622 and the hydrographic series to no. 4937. In the tables the series are distinguished by the prefixed letters D and H, respectively.

Only those stations where the ship's gear was used (i. e., with the ship as an instrument) to collect natural-history specimens have been designated in the records as dredging stations. At times specimens were taken with dip nets during the occupation of a hydrographic station, but on account of the irregularity of such collecting the station was not regarded as a collecting station. No numbers have been given to the numerous shore stations, nor to minor collections made with the ship at anchor. But numbers have been given in the dredging series to hauls of the large intermediate net when used in a tideway with the ship at anchor.

Since the shore work constitutes such an important part of the total, the data regarding shore stations is shown in chronological order with the dredging stations, the locality, apparatus, etc., appearing in the appropriate columns. To economize time most of the reef collections of fishes were made with dynamite. The method was to locate the desirable fishes in the coral growth by means of a view glass (a glass-bottomed box) used from a boat. A small charge of dynamite with electrical connections was carefully lowered and discharged. Such fishes as floated were at once collected with a dip net, and the place marked by a buoy. As soon as the bottom had cleared it was searched and the dead fish gathered by diving or more usually by means of long-handled spears.

The various kinds of apparatus used at each station are recorded in the tables in chronological order, each on a separate line, opposite the station number, or, in case of unnumbered stations, opposite the locality, in the column "Apparatus."

The "Position" of a station is that point occupied by the vessel, as determined by the navigator at the time of beginning the first operation at that station. The position of the subsequent operations under the same station number corresponds in a general way to the line as indicated under "Drift." The distance covered by all the operations of a station is usually, however, not greater than the negligible error of observation, except in stations near shore determined by bearings.

In relation to the hydrographic information obtained, the degree of accuracy with which positions are located is of greater importance, and a description of the methods is necessary to the proper use of this information. A great part of the region traversed is still unsurveyed; and even where surveyed, parts are incorrectly or incompletely charted. Owing to press of work and lack of time, no opportunity was afforded to correct such errors, and the best available charts were therefore used as the basis of all determinations of position when in sight of land; in the column "Chart" is noted the number and edition of the chart used at each station.

When in sight of land position was fixed by compass bearings, and from the position so obtained *on the chart in use* the latitude and longitude were pricked off and set down in the record as the position of the station. If these charts should hereafter be corrected in latitude and longitude, the positions assigned to the stations must be changed accordingly.

In conformity with previous practice, an additional position, by true bearing and distance, of some prominent shore feature is given for each station when practicable. As viewed from the ship, the nearest and most prominent objects on shore from which the ship's position was determined were often topographical features, inconspicuous and unnamed on the chart, and impossible of identification by a brief written description. Therefore the bearings given in the tables were laid off from the plotted position on the chart to some object prominent on the chart, whether the object could actually be seen from the ship or not; though whenever convenient one of the two points taken for bearings by the navigator in determining the position is used in the table as the point of reference. The letters (S.), (N.), (W.), or (E.) indicate, respectively, the south, north, west, or east tangent of the point of reference after which they are placed; e. g., Verde Id. (E.)=eastern tangent of Verde Island.

All bearings are true unless otherwise indicated.

The spelling of all geographic names in these tables is that found on the charts designated in the column "Chart." There is considerable variation in this respect in the different issues of charts.

"Time of day" in the case of soundings indicates the time the plummet struck bottom; in the case of dredgings, the time at which the apparatus began to tow on the bottom; in the case of intermediate nets, the time at which the nets started to tow at the depth indicated; in the case of surface hauls, the time at which they were lowered into the water and began to be towed or the current to pass through them.

"Depth" (in fathoms) is the depth obtained by the sounding when a sounding was made. In cases where no sounding was made the depth is estimated from the chart, unless the station immediately follows another, in which case the depth obtained at the preceding station is given. In seine hauls the depths given are approximate, and represent the greatest depth of water through which the seine was hauled.

"Temperatures." The air temperatures are taken from the ship's log for the hour nearest the hour entered in the time column; the same is true of the surface temperatures where the towing commenced near the hour mark, but in other cases the surface temperature was

taken at the time given. The bottom temperature was taken at the time of sounding. All readings by Fahrenheit thermometer.

"Density." The water density is in all cases reduced to 15° C. The density of bottom water was ascertained from a sample taken by the Sigsbee water bottle. Inability to secure an accurate working of this instrument led to the discontinuance of the trials.

In the double column "Trial" is indicated the depth at which apparatus was worked, as well as the duration of operation. In the case of bottom apparatus this latter is the time during which it is supposed to be dragging on the bottom, up to the beginning of reeling in; for intermediate nets the time occupied in towing at the depth shown in the depth column is indicated by the first quantity, the time occupied in hoisting by the second; for surface nets the time indicated is the time actually towed at the surface.

In the double column of "Drift" is shown approximately the general direction in which the gear was hauled as well as the distance. The state of the currents and of the wind, with the exigencies incident to the steering of the ship, make this more or less inaccurate.

The apparatus used consisted of the usual beam trawls for all work on the bottom. All intermediate and surface work was done with a large tow net and small plankton or Kofoid nets, except an unsuccessful trial of a triangular shear-board net.

### Abbreviations and Symbols.

12′ Ag.....12-foot Agassiz beam trawl. The Agassiz type of beam trawl was used more and with better results than any other used during the cruise. The runners now in use stand 4 feet in height and the usual type of net carries a taut headline, making the full opening available. For deep-sea work where the possibility of upsetting the frame is great, a reversible net is used, with a running bolt-rope passing through the clips forward of the middle of the shoes. The use of this net is indicated by the abbreviation "rev."

25′ Ag. .....The same runners used in the 12-foot frame but spread by use of two light spars for beams to a 25-foot opening. Used successfully on smooth bottoms.

9′ Alb.-Blk.....9-foot Albatross-Blake beam trawl.

B. A.....British Admiralty.

3-bd. int.....a net with triangular opening operated by 3 shear boards and handled by a 3-part bridle from dredging cable—in no case successfully.

2′ Blk.....a 2-foot Blake trawl, generally used from a steam launch or rowboat; net made of ½-inch webbing.

botm.....bottom.

C. S.....Coast Survey.

D.....dredging, or collecting, station.

dip.....ordinary dip net on a 12-inch or 14-inch ring, with bamboo handle; used extensively in reef fishing with dynamite and from the gang plank with electric light.

dyn.....dynamite.

e. l.....electric light.
H.....hydrographic station.
H. O.....U. S. Hydrographic Office.
hbr.....harbor.
int. 3.....intermediate 3. This is a large ship's net on a 5½-foot ring; net about 11 feet long made of no. 0000 grit gauze, with about 3 feet of the bottom of no. 3 silk, and a brass bucket at the bottom. The outside netting is ½-inch webbing for the protection of the silk.
int. 4.....intermediate 4; same as intermediate 3, but with an extension of 6 feet of 1-inch webbing carried to a 10-foot ring, thus increasing the opening to 10 feet.
int. 5.....intermediate 5; similar to intermediate 4, but with no. 14 grit gauze only in the bottom part from the 3-foot ring to the bucket; above this ½-inch webbing to the 5½-foot ring, and thence 6 feet of ¾-inch webbing to the 10-foot ring. Equipped with a funnel of ¾-inch webbing.
9′ Jn. dr.....Johnston oyster dredge. This is an Albatross-Blake beam trawl with a rake bar bolted at the heel. Used also in 6-foot length.
K. 1.....a small plankton or Kofoid net, made of no. 12 silk, on a 14-inch ring.
K. 2.....same as above, but made of no. 20 silk.
K. 4.....same as above, but made of no. 3 silk.
K. 5.....same as K. 2, but made of no. 1 silk.
K. 6.....a net of same length as other Kofoid nets, but provided with clamps on opposite sides of the ring to attach directly to the cable; also with a bail from the ring to the bucket. Designed to lower and hoist with the ship lying to and the cable running vertically, thus making no catch except while ship is underway and towing.
Lt.....light.
Luc. sdr.....Lucas sounding machine.
m. b.....mud bag. When more than one mud bag is used the two supplementary bags are rigged one at either end of the trawl frame.
6′ McC.....6-foot McCormick; an adaptation of the Blake trawl frame, with rear beam bolted to bottom shoe and serving as a spindle on which bent teeth of ½ by 2 inch iron work as a rake. Not successful.
2′ o. p.....open plankton net on 2-foot ring; made of no. 1 silk.
spec.....specimen.
12′ Tnr.....12-foot Tanner beam trawl.
Tnr.-Blish sdr...Tanner-Blish sounding machine.
therm.....Negretti & Zambra thermometer, with Tanner case.
wat. bot.....Sigsbee water bottle.

* signifies depth as shown by chart when no sounding has been made.
** signifies depth and character of bottom as obtained by sounding at previous station.
‡ signifies nets towed astern, from taffrail, side by side.
§ signifies apparatus towed (horizontally) at depth indicated, during number of minutes given in the first period; then hoisted (vertically) to surface, net open, in time next shown.

The letters (a), (b), (c), (d), (e), when used with the abbreviation for sounding apparatus, indicate the kind of sounding cup used; thus,

(a)...Sigsbee sounding rod.
(b)...Lucas snapper.
(c)...Lucas 4-tube sounding rod.
(d)...bail-cutter.
(e)...ordinary lead with tallow.

"Character of bottom," determined by the specimens from the sounding cup, is expressed by abbreviations, the key to which is appended. It will be noted that these abbreviations are arbitrarily capitalized for nouns. When used as adjectives, however, the noun abbreviations are not capitalized.

| | | | |
|---|---|---|---|
| bk....black. | fne....fine. | M.....Mud. | sctrd...scattered. |
| bl.....blue. | For...Foraminifera. | mrgn...marginal. | Sh.....Shells. |
| br.....brown. | G.....Gravel. | Mss....Masses. | sml.....small. |
| br-gn..brownish-green. | Glob..Globigerina. | Oz....Ooze. | Sp.....Specks. |
| brk....broken. | gn....green. | P.....Pebbles. | St.....Stones. |
| C.....Clay. | gn-br..greenish-brown. | Ptr....Pteropod. | vol....volcanic. |
| Clmps.Clumps. | gn-gy..greenish-gray. | R.....Rock. | W.....Seaweed. |
| Co.....Coral. | gy....gray. | Rf.....Reef. | wh.....white. |
| crs.....coarse. | hrd...hard. | rky.....rocky. | |
| dk.....dark. | Lav....Lava. | S.....Sand. | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Between Honolulu and Manila.* | | 1907. | | *fms.* | |
| ..... | Midway Ids. Harbor..... | ..... | Nov. 7 | 10.00 a. m. | ..... | co. Clmps.; S..... |
| ..... | .....do..... | ..... | Nov. 8 | 9.00 a. m. | ..... | Co..... |
| ..... | Guam; Apra Bay (rf)..... | ..... | Nov. 19 | 1.00 p. m. | ..... | mrgn. co. Rf..... |
| ..... | .....do..... | ..... | Nov. 20 | 1.00 p. m. | ..... | co. Mss..... |
| ..... | .....do..... | ..... | Nov. 21 | 9.00 a. m. | ..... | mrgn. Rf; sml. staghorn Clmps; S. |
| ..... | .....do..... | ..... | ...do..... | 1.00 p. m. | ..... | co. Mss.; S..... |
| | *Manila Bay and vicinity.*[a] | | | | | |
| ..... | Manila Bay (Luneta Beach). | C. S. 4240; Feb., 1907. | Dec. 6 | 3.00 p. m. | ..... | M., S..... |
| ..... | Manila Bay, inside breakwater (anch.). | .....do..... | ...do..... | 7.00 p. m. | 3.5 | M..... |
| ..... | .....do..... | .....do..... | Dec. 7 | 7.00 p. m. | 3.5 | M..... |
| ..... | .....do..... | .....do..... | Dec. 8 | 7.00 p. m. | 3.5 | M..... |
| ..... | Manila Bay (Malate Beach).. | C. S. 4712... Sept., 1904. | Dec. 9 | 9.00 a. m. | ..... | fne. S..... |
| ..... | Manila Bay, inside breakwater (anch.). | .....do..... | ...do..... | 7.00 p. m. | 3.5 | M..... |
| ..... | Manila Bay, inside breakwater. | .....do..... | Dec. 11 | 8.00 p. m. | ..... | M..... |
| ..... | .....do..... | .....do..... | Dec. 12 | 10.00 a. m. | 2 | M..... |
| ..... | Manila Bay, outside breakwater. | .....do..... | ...do..... | 1.30 p. m. | ..... | M., sml. R..... |
| ..... | Manila Bay (Luneta Beach). | .....do..... | Dec. 30 | 9.00 a. m. | ..... | M., S..... |
| ..... | Manila Bay (near anch.)..... | .....do..... | ...do..... | 4.00 p. m. | 3.5 | M..... |
| | *China Sea off southern Luzon.* | | 1908. | | | |
| D. 5096 | Corregidor Lt., N. 2.70 miles (14° 20′ 23″ N., 120° 34′ 15″ E.). | C. S. 4240; Feb., 1907. | Jan. 2 | 10.42 a. m. | 28 | gy. M., S., Sh..... |
| | | | | 11.01 a. m. | 28 | gy. M., S., Sh..... |
| D. 5097 | Corregidor Lt., N. 6° E., 3.60 miles (14° 19′ 15″ N., 120° 33′ 52″ E.). | .....do..... | ...do..... | 11.18 a. m. | *30 | gy. M., S., Sh..... |
| D. 5098 | Corregidor Lt., N. 21° E., 4.30 miles (14° 18′ 40″ N., 120° 32′ 40″ E.). | .....do..... | ...do..... | 12.44 p. m. | *38 | gy. M., S., Sh..... |
| D. 5099 | Corregidor Lt., N. 36° E., 4.80 miles (14° 18′ 55″ N., 120° 31′ 20″ E.). | .....do..... | ...do..... | 1.21 p. m. | *30 | gy. M., S., Sh..... |
| D. 5100 | Corregidor Lt., N. 16° E., 5.70 miles (14° 17′ 15″ N., 120° 32′ 40″ E.). | .....do..... | ...do..... | 2.15 p. m. | 35 | gy. S..... |
| | | | | 2.22 p. m. | 35 | gy. S..... |
| D. 5101 | Corregidor Lt., S. 82° E., 10.50 miles (14° 24′ 30″ N., 120° 23′ 20″ E.). | .....do..... | Jan. 6 | 1.16 p. m. | *43 | ..... |
| D. 5102 | Sueste Pt. Lt., S. 85° W., 1.20 miles (14° 45′ N., 120° 12′ 30″ E.). | C. S. 4254; Sept., 1902. | ...do..... | 4.20 p. m. | *33 | ..... |
| ..... | Subig Bay (Subig anch.)..... | .....do..... | ...do..... | 7.00 p. m. | 11 | ..... |
| ..... | Subig Bay, Subig (beach)..... | .....do..... | Jan. 7 | 9.00 a. m. | ..... | S..... |
| D. 5103 | Calaclan Pt., S. 86° E., 2.50 miles (14° 49′ 30″ N., 120° 13′ 30″ E.). | .....do..... | ...do..... | 1.46 p. m. | *20 | gy. M..... |

[a] From December 16 to 21 a shore party made collections at the mouth of the Santa Cruz River and the adjacent shore of Laguna de Bay and visited the markets at Santa Cruz and Majayjay. A party visited Taal Lake December 24 to 29 and made collections by seining (45′ seine) on the south side of Taal Id., and by purchase from natives on the Pansipit River, and at Taal December 31 and January 1 a shore party made collections on Mariquina River.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn. | 8-12 ft. | 1 00 | | | Work interrupted by storm. |
| | | | | | dyn. | 20-30 ft. | 2 00 | | | |
| | | | | | dyn. | 6-20 ft. | 4 00 | | | |
| | | | | | dyn. | 6-20 ft. | 3 00 | | | |
| | | | | | dyn. | 3-10 ft. | 3 00 | | | Mostly on shore flat. |
| | | | | | dyn. | 6-20 ft. | 2 00 | | | |
| | | | | | 100′ seine. | 4 ft | 2 30 | | | 5 hauls. |
| | | | | | dip; e. l. | surf. | 2 00 | | | |
| | | | | | dip; e. l. | surf. | 2 00 | | | |
| | | | | | dip; e. l. | surf. | 2 00 | | | |
| | | | | | 150′ seine. | 6 ft | 2 30 | | | Do. |
| | | | | | dip; e. l. | surf. | 2 00 | | | |
| | | | | | 2′ o. p. | surf. | 20 | | | Towed from steam launch. |
| | | | | | 2′ Blk. | botm. | | | | Do. |
| | | | | | 2′ Blk. | botm. | | | | Several hauls from mouth of Pasig River to outer entrance through breakwater. |
| | | | | | 150′ seine. | 4 ft | 2 30 | | | 5 hauls. |
| | | | | | 2 wire traps. | botm. | | | | Finally hauled on Jan. 4, 1908. |
| 79.5 | 79 | | | | Tnr.-Blish. sdr. (b). | | | | | |
| 79.7 | 79 | | | | 9′ Tnr.; m. b. | botm. | 21 | SW.[a] | | Veered 5 fms. during haul, not on bottom; water-haul. |
| 80 | 79 | | | | 9′ Tnr.; m. b. | botm. | 19 | NW. by W.[a] | | Veered at 5 minute intervals from 75 to 94 and to 104 fms. Trawl capsized on bottom, but made a small catch. |
| 82 | 79 | | | | 9′ Tnr.; m. b. | botm. | 20 | W. by N.[a] | | Net capsized on bottom, but made a small catch. |
| 81 | 80 | | | | 9′ Tnr.; m. b. | botm. | 20 | W. by N.[a] | | |
| 86 | 80 | | | | Tnr.-Blish. sdr. (b). | | | | | |
| | | | | | 9′ Tnr.; m. b. | botm. | 20 | NE.[a] | | |
| 82 | 78 | | 1.02391 | | int. 4 § | 37 fms. | 20<br>4 | NW. ½ W. | | 70 fms. dredge cable out. |
| 86.5 | 81 | | 1.02447 | | int. 4 § | 28 fms. | 20<br>3 | N. 11° E. | | Cable veered from 45 to 57 fms. during haul. |
| | | | | | dip.; e. l. | surf. | 2 00 | | | |
| | | | | | 250′ seine. | 20 ft | 2 30 | | | 5 hauls. |
| 84 | 79 | | | | 12′ Tnr.; m. b. | botm. | 20 | S. 45° E. | 0.6 | |

[a] Course steered by ship.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *China Sea off southern Luzon*—Continued. | | 1908. | | *fms.* | |
| ..... | Olongapo (beach)..... | C. S. 4254; Sept., 1902. | Jan. 7 | 2.00 p. m. | ..... | S..... |
| ..... | Beach opposite Olongapo.... | .....do..... | ...do..... | 3.30 p. m. | ..... | grassy..... |
| ..... | Olongapo (anch.)..... | .....do..... | ...do..... | 7.00 p. m. | 13 | ..... |
| D. 5104 | Sueste Pt. Lt., S. 58° W., 1.30 miles (14° 45′ 48″ N., 120° 12′ 20″ E.). | .....do..... | Jan. 8 | 10.20 a. m. | *33 | (?)..... |
| D. 5105 | Sueste Pt. Lt., N. 57° W., 1.90 miles (14° 43′ 55″ N., 120° 12′ 50″ E.). | .....do..... | ...do..... | 11.06 a. m. | *25 | (?)..... |
| ..... | Grande I. (rf.)..... | .....do..... | ...do..... | 1.00 p. m. | ..... | sctrd. Clmps. Co... |
| ..... | Port Binanga (beach)..... | .....do..... | ...do..... | 2.00 p. m. | ..... | ..... |
| ..... | Port Binanga (anch.)..... | .....do..... | ...do..... | 7.00 p. m. | 6 | ..... |
| ..... | Port Binanga (rf.)..... | .....do..... | Jan. 9 | 8.30 a. m. | ..... | sctrd. Clmps. Co... |
| D. 5106 | Corregidor Lt., S. 57° E., 2.25 miles (14° 23′ 55″ N., 120° 32′ 33″ E.). | C. S. 4240; Feb., 1907. | ...do..... | 1.58 p. m. | *37 | gy. M..... |
| D. 5107 | Corregidor Lt., S. 17° E., 1.75 miles (14° 24′ 30″ N., 120° 33′ 40″ E.). | .....do..... | ...do..... | 2.38 p. m. | *28 | gy. M..... |
| ..... | Manila Bay (Luneta Beach). | .....do..... | Jan. 13 | ..... | ..... | fne. S..... |
| ..... | Limbones Cove (E. shore, beach). | .....do..... | Jan. 14 | 4.30 p. m. | ..... | S., P., Co..... |
| ..... | Limbones Cove (SW. shore, rf.). | .....do..... | ...do..... | 4.30 p. m. | ..... | solid Co..... |
| ..... | Limbones Cove (anch.)..... | .....do..... | ...do..... | 7.00 p. m. | 10 | ..... |
| D. 5108 | Corregidor Lt., N. 39° E., 22.50 miles (14° 05′ 5″ N., 120° 19′ 45″ E.). | .....do..... | Jan. 15 | 8.01 a. m. | 13 | Co..... |
| | | | | 8.34 a. m. | 13 | Co..... |
| | | | | 8.47 a. m. | 16 | Co..... |
| | | | | 9.00 a. m. | 16 | Co..... |
| | | | | 9.20 a. m. | 16 | Co..... |
| D. 5109 | Corregidor Lt., N. 42° E., 25.80 miles (14° 03′ 45″ N., 120° 16′ 30″ E.). | .....do..... | ...do..... | 10.26 a. m. | 10 | Co..... |
| | | | | 10.43 a. m. | 12 | Co..... |
| D. 5110 | Corregidor Lt., N. 20° E., 25 miles (13° 59′ 20″ N., 120° 75′ 45″ E.). | .....do..... | ...do..... | 3.18 p. m. | 135 | dk. gy. M..... |
| | | | | 3.32 p. m. | 135 | dk. gy. M..... |
| ..... | Nasugbu Bay (anch.)..... | .....do..... | ...do..... | 7.00 p. m. | 10 | ..... |
| ..... | Nasugbu Bay (beach near town). | .....do..... | Jan. 16 | 9.00 a. m. | ..... | S..... |
| ..... | Nasugbu Bay (Pillar Rock, rf.). | .....do..... | ...do..... | 9.00 a. m. | ..... | sctrd. Clmps. Co... |
| D. 5111 | Sombrero Id., S. 41° E., 4.50 miles (13° 45′ 15″ N., 120° 46′ 30″ E.). | .....do..... | ...do..... | 2.38 p. m. | 236 | ..... |
| | | | | 3.08 p. m. | 236 | gn. M..... |
| ..... | Balayan Bay (Taal anch.)... | .....do..... | ...do..... | 7.00 p. m. | 10 | ..... |
| D. 5112 | Sombrero Id., S. 18° E., 6.75 miles (13° 48′ 22″ N., 120° 47′ 25″ E.). | .....do..... | Jan. 17 | 2.06 p. m. | 177 | dk. gn. M..... |
| | | | | 2.33 p. m. | 177 | dk. gn. M..... |
| D. 5113 | Sombrero Id., S. 7° W., 9.50 miles (13° 51′ 30″ N., 120° 50′ 30″ E.). | .....do..... | ...do..... | 3.43 p. m. | 159 | dk. gn. M..... |
| | | | | 4.02 p. m. | 159 | dk. gn. M..... |
| | *Balayan Bay and Verde Id. Passage.*[a] | | | | | |
| ..... | Balayan Bay (Ligpo Pt. rf.). | C. S. 4240, | Jan. 18 | 10.00 a. m. | ..... | dense Co., S..... |

[a] Collecting trip to Taal Lake on Jan. 18. Dredging with hand dredge.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | 250′ seine | 20 ft | 1 15 | | | 1 haul. |
| | | | | | 250′ seine | 8 ft | 1 15 | | | Do. |
| | | | | | dip.; e. l | surf | 2 00 | | | |
| 81 | 78 | | | | 12′ Tnr.; m. b. | botm | 20 | S. 22° W | 0.8 | |
| 81 | 78 | | | | 12′ Tnr.; m. b. | botm | 20 | N. 60° W | (?) | |
| | | | | | dyn | 6–20 ft | 4 30 | | | |
| | | | | | 150′ seine | | 2 00 | | | 4 hauls. |
| | | | | | dip.; e. l | surf | 2 00 | | | |
| | | | | | dyn | 6–15 ft | 2 00 | | | |
| 86.5 | 78 | | 1.02393 | | 12′ Tnr.; m. b | botm | 20 | N. 48° E | 1.2 | Tail lashing slipped; no catch except in mud bag. |
| 84.5 | 78 | | 1.02379 | | 12′ Tnr.; m. b. | botm | 20 | N. 44° E | 1.7 | |
| | | | | | 150′ seine | 4 ft | | | | |
| | | | | | 250′ seine | 12 ft | 1 30 | | | |
| | | | | | dyn | 6–12 ft | 1 30 | | | |
| | | | | | dip.; e. l | surf | 2 00 | | | |
| 80 | 80 | 80 | 1.02406 | | Tnr.-Blish sdr. (b). | | | | | |
| 80 | 80 | | | | 9′ Alb.-Blk.; m. b. | botm | 1 | N. 36° E | | Dredging cable fouled gin block. Trawl not dragged on bottom. |
| 81 | 80 | | | | Tnr.-Blish sdr. (b). | | | | | |
| 81 | 80 | | | | 8 swabs | botm | 10 | S | .3 | |
| 81 | 80 | | | | 9 hand lines | botm | 23 | | | No catch. |
| 82 | 80 | | 1.02386 | | 9′ Alb.-Blk | botm | 12 | | (?) | Trawl immediately torn on coral. |
| 82 | 80 | | | | 8 swabs | botm | 11 | | (?) | Soundings with hand lead. |
| 89 | 80 | 59 | 1.02406 | | Tnr.-Blish sdr (b). | | | | | |
| 85 | 80 | | | | 12′ Tnr.; m. b. | botm | 20 | N. 20° E | .6 | 20 fms. cable veered during haul. |
| | | | | | dip.; e. l | surf | 2 00 | | | |
| | | | | | 130′ seine | | 2 30 | | | |
| | | | | | dyn | 6–15 ft | 3 00 | | | |
| 84 | 80 | | | | Tnr.-Blish sdr. (b). | | | | | Sounding cup lost; therm. did not trip. |
| 84 | 80 | | | | 12′ Tnr.; m. b. | botm | 30 | N. 22° E | 1.8 | |
| | | | | | dip; e. l | surf | 1 30 | | | |
| 86 | 80 | 52.4 | 1.02416 | 1.02496 | Tnr.-Blish sdr. (b). | | | | | |
| 84 | 80 | | | | 12′ Tnr.; m. b. | botm | 30 | N. 13° E | 1.3 | |
| 82 | 80 | | 1.02413 | | Tnr.-Blish sdr. (e). | | | | | |
| 80 | 80 | | | | 12′ Tnr.; m. b. | botm | 10 | N. 9° E | .6 | Uneven bottom. |
| | | | | | dyn | 6–20 ft | 5 00 | | | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Balayan Bay and Verde Id. Passage*—Continued. | | 1908. | | *fms.* | |
| ..... | Balayan Bay (near beach, Taal). | C. S. 4240; Feb., 1907. | Jan. 19 | 3.00 p. m. | ..... | blk. S., M. |
| ..... | Balayan Bay (Taal, anch.) | ....do.... | ...do... | 7.00 p. m. | 10 | ..... |
| ..... | Maricaban Id. (rf. inside Sepoc Pt.). | ....do.... | Jan. 20 | 9.00 a. m. | ..... | dense Co., S. |
| D. 5114 | Sombrero Id. N. 36° E., 7.2 miles (13° 36′ 11″ N., 120° 45′ 26″ E.). | ....do.... | ...do... | 10.49 a. m. | 340 | fne. S. |
| | | | | 11.17 a. m. | 340 | fne. S. |
| D. 5115 | Sombrero Id. N. 49° E., 7.30 miles (13° 37′ 11″ N., 120° 43′ 40″ E.). | ....do.... | ...do... | 1.08 p. m. | 340 | (?) |
| | | | | 1.41 p. m. | 340 | (?) |
| D. 5116 | Sombrero Id. N. 69° E., 2.50 miles (13° 41′ N., 120° 47′ 05″ E.). | ....do.... | ...do... | 2.53 p. m. | 200 | (?) |
| | | | | 3.13 p. m. | 200 | (?) |
| D. 5117 | Sombrero Id. S. 17° E., 10.80 miles (13° 52′ 22″ N., 120° 46′ 22″ E.). | ....do.... | Jan. 21 | 9.10 a. m. | 118 | (?) |
| | | | | 9.27 a. m. | 118 | dk. gn. M. |
| D. 5118 | Sombrero Id. S. 47° E., 10 miles (13° 48′ 45″ N., 120° 41′ 51″ E.). | ....do.... | ...do... | 10.41 a. m. | 159 | dk. gn. M. |
| | | | | 11.00 a. m. | 159 | dk. gn. M. |
| D. 5119 | Sombrero Id. S. 80° E., 18.90 miles (13° 45′ 05″ N., 120° 30′ 30″ E.). | ....do.... | ...do... | 1.24 p. m. | 394 | gn. M., S. |
| | | | | 1.56 p. m. | 394 | gn. M., S. |
| D. 5120 | Sombrero Id., S. 79° 30′ E., 19.2 miles (13° 45′ 30″ N., 120° 30′ 15″ E.). | ....do.... | ...do... | 2.41 p. m. | 393 | gn. M., S. |
| | | | | 3.10 p. m. | 393 | ..... |
| ..... | Nasugbu Bay (anch.) | ....do.... | ...do... | 7.30 p. m. | 10 | ..... |
| ..... | Manila Bay (inside breakwater). | ....do.... | Jan. 28 | 11.00 a. m. | ..... | ..... |
| ..... | Manila Bay (inside breakwater, anch.). | ....do.... | Jan. 31 | 10.00 a. m. | ..... | ..... |
| | *East coast of Mindoro.* | | | | | |
| D. 5121 | Malabrigo Lt., N. 14° W., 9 miles (13° 27′ 20″ N., 121° 17′ 45″ E.). | C. S. 4714; June, 1906. | Feb. 2 | 8.14 a. m. | 108 | dk. gn. M. |
| | | | | 8.30 a. m. | 108 | dk. gn. M. |
| D. 5122 | Malabrigo Lt., N. 46° W., 20.60 miles (13° 21′ 30″ N., °120 30′ 33″ E.). | ....do.... | ...do... | 10.34 a. m. | 220 | gn. M. |
| | | | | 10.59 a. m. | 220 | gn. M. |
| D. 5123 | Malabrigo Lt., N. 44° W., 32.50 miles (13° 12′ 45″ N., 121° 38′ 45″ E.). | ....do.... | ...do... | 1.09 p. m. | 283 | gn. M. |
| | | | | 1.44 p. m. | 283 | gn. M. |
| D. 5124 | Pt. Origon (N.), S. 56° E., 20.75 miles (12° 52′ N., 121° 48′ 30″ E.). | ....do.... | ...do... | 5.04 p. m. | 281 | sft. gn. M. |
| | | | | 5.38 p. m. | 281 | sft. gn. M. |
| | *Sulu Sea, vicinity southern Panay.* | | | | | |
| D. 5125 | Nogas Id. (W.), S. 11° E., 24 miles (10° 48′ N., 121° 48′ 30″ E.). | C. S. 4718, Dec., 1906. | Feb. 3 | 9.07 a. m. | 411 | gn. M. |
| | | | | 9.41 a. m. | 411 | ..... |
| D. 5126 | Nogas Id. (W.), S. 26° 30′ E., 11.75 miles (10° 34′ 45″ N., 121° 47′ 30″ E.). | ....do.... | ...do... | 1.05 p. m. | 742 | sft. gn. M. |
| | | | | 2.00 p. m. | 742 | sft. gn. M. |
| ..... | Naso Pt., Panay (anch.) | ....do.... | ...do... | 7.00 p. m. | 10 | ..... |
| ..... | Naso Pt., Panay (near anch.) | ....do.... | ...do... | 7.00 p. m. | ..... | ..... |
| ..... | Naso Pt., Panay (beach) | ....do.... | Feb. 4 | 8.30 a. m. | ..... | ..... |
| ..... | Naso Pt., Panay (shore, tide pools). | ....do.... | ...do... | 9.00 a. m. | ..... | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | 250 fm. seine | | 2 00 | | | Purse seine owned and hauled by native fishermen. |
| | | | | | dip.; e. l. | surf. | 1 30 | | | |
| | | | | | dyn. | 6–20 ft. | 5 00 | | | |
| 81.5 | 79 | | 1.02447 | | Luc. sdr. (e) | | | | | |
| 84 | 80 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 54° E. | 0.5 | Cable veered from 460 to 520 fms. during haul. |
| 82 | 80 | (?) | 1.02434 | 1.02454 | Luc. sdr. (b) | | | | | Sounding cup did not close. Therm. not properly attached and fouled water bottle. |
| 83 | 80 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 43° E. | 1.0 | |
| 86 | 80 | 50.2 | 1.02426 | | Luc. sdr. (b) | | | | | Therm. not properly attached; fouled stray line. |
| 86 | 80 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 5° E. | 0.5 | |
| 82 | 79 | | 1.02475 | | Tnr.-Blish sdr. (b). | | | | | No specimen in sounding cup. |
| 82 | 79 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 31° W. | 0.8 | |
| 81 | 79 | | 1.02426 | | Tnr.-Blish sdr. (b). | | | | | |
| 81 | 79 | | | | 12′ Tnr.; m. b. | botm. | 30 | N. 50° W. | 0.8 | |
| 82 | 80 | 43.7 | 1.02386 | 1.02468 | Luc. sdr. (b) | | | | | |
| 82 | 80 | | | | 12′ Tnr.; m. b. | botm. | 9 | N. 23° E. | 1.0 | |
| 82 | 80 | 43.7 | 1.02386 | 1.02480 | Luc. sdr. (b) | | | | | |
| 82 | 80 | | | | int. 4 § | 350 fms. | 20 | N. 5° W. | 1.0 | 393 fms. dredge cable out. |
| | | | | | | | 17 | | | |
| | | | | | dip.; e. l. | surf. | 1 30 | | | |
| | | | | | 2′ o. p. | surf. | 15 | | | Towed from steam launch. |
| | | | | | dyn. cap.; dip. | surf. | | | | |
| 76 | 79 | | 1.02420 | | Tnr.-Blish sdr. (b). | | | | | |
| 76 | 79 | | | | 12′ Tnr.; m. b. | botm. | 20 | S. 79° E. | 1.0 | |
| 78 | 79 | | 1.02489 | | Tnr.-Blish sdr. (b). | | | | | Snapper failed to close. |
| 79 | 79 | | | | 12′ Tnr.; m. b. | botm. | 20 | S. 59° E. | 1.3 | |
| 80 | 79 | | 1.02475 | | Tnr.-Blish sdr. (b). | | | | | Do. |
| 79 | 79 | | | | 12′ Tnr.; m. b. | botm. | 20 | S. 6° W. | 1.3 | |
| 82 | 79 | | 1.02468 | | Tnr.-Blish sdr. (b). | | | | | Do. |
| 80.5 | 79 | | | | 12′ Tnr.; m. b. | botm. | 17 | S. 9° W. | 1.5 | |
| 81 | 80 | 50 | 1.02444 | 1.02475 | Luc. sdr. (b) | | | | | |
| 83.5 | 80 | | | | int. 4 § | 365 fms. | 20 | N. 62° W. | 1.5 | 550 fms. dredge cable out. |
| | | | | | | | 26 | | | |
| 83 | 80 | 49.5 | (?) | (?) | Luc. sdr. (a) | | | | | No specimen in water bottle. |
| 84 | 80 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 81° W. | 1.5 | |
| | | | | | dip.; e. l. | surf. | 1 30 | | | |
| | | | | | 5 gill nets | bot m. and surf. | | | | Set over night. |
| | | | | | 130′ seine | 10 ft. | 3 00 | | | 6 hauls. |
| | | | | | copper sulphate. | | 2 00 | | | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Sulu Sea, vicinity southern Panay*—Continued. | | 1908. | | *fms.* | |
| D. 5127 | Nogas Id. (W.), N. 11° 30′ E., 22 mile (10° 02′ 45″ N., 121° 48′ 15″ E.). | C. S. 4718; Dec., 1906. | Feb. 4. | 2.57 p. m.<br>4.06 p. m. | 958<br>958 | gy. M., Glob.....<br>gy. M., Glob..... |
| D. 5128 | Nogas Id. (W.), N. 6° E., 32.50 miles (9° 52′ 10″ N., 121° 49′ 35″ E.). | .....do..... | ...do.... | 7.05 p. m. | ..... | ..... |
| | *Sulu Sea off western Mindanao.* | | | | | |
| H. 4897 | Dulunguin Pt., S. 70° E., 4.80 mile (7° 46′ N., 122° E.). | C. S. 4723, Oct., 1905. | Feb. 5 | 11.43 a. m. | 1,570 | gy. M., Glob..... |
| H. 4898 | Dulunguin Pt., N. 50° E., 1 mile (7° 43′ 45″ N., 122° 03′ 45″ E.). | .....do..... | ...do... | 1.13 p. m. | 221 | gy. M., Glob..... |
| D. 5129 | Dulunguin Pt., N. 44° E., 3.80 miles (7° 41′ 30″ N., 122° 01′ 45″ E.). | .....do..... | ...do.... | 2.04 p. m.<br>2.23 p. m. | 0–100<br>..... | .....<br>..... |
| D. 5130 | Dulunguin Pt., N. 1° W., 9.50 miles (7° 35′ N., 122° 04′ 45″ E.). | .....do..... | ...do.... | 3.29 p. m.<br>3.48 p. m. | 102<br>102 | .....<br>..... |
| ..... | Panabutan Bay (NW. beach, near river). | C. S. 4644; July, 1905. | ...do.... | 5.00 p. m. | ..... | sft. M., S..... |
| ..... | Panabutan Bay (anch.) | .....do..... | ...do.... | 7.30 p. m. | 11 | ..... |
| H. 4899 | Id. off Panabutan Pt., S. 78° W., 3 miles. | .....do..... | Feb. 6 | 8.48 a. m. | 18 | sft. gn. M..... |
| H. 4900 | Id. off Panabutan Pt., W., 0.30 mile. | .....do..... | ...do..... | 8.58 a. m. | 19 | sft. gn. M ..... |
| H. 4901 | Id. off Panabutan Pt., N. 52° W., 0.30 mile. | .....do..... | ...do..... | 9.04 a. m. | 21 | gn. M., S..... |
| ..... | Panabutan Bay (beach) | .....do..... | ...do..... | 9.00 a. m. | ..... | S., M..... |
| ..... | Panabutan Bay (Siriguay Pt., rf.). | .....do..... | ...do..... | 9.00 a. m. | ..... | sctrd. Co..... |
| H. 4902 | Id. off Panabutan Pt., N. 31° W., 0.50 mile. | .....do..... | ...do..... | 9.10 a. m. | 23 | gn. M., fne S..... |
| H. 4903 | Id. off Panabutan Pt., N. 15° W., 0.50 mile. | .....do..... | ...do..... | ..... | 27 | co. S..... |
| D. 5131 | Id. off Panabutan Pt., N. 20° E., 0.40 mile. | .....do..... | ...do..... | 9.14 a. m.<br>9.27 a. m. | 27<br>27 | gn. M., co. S.....<br>gn. M., co. S..... |
| D. 5132 | Id. off Panabutan Pt., N. 15° W., 0.30 mile. | .....do..... | ...do..... | 9.54 a. m. | *26 | gn. M., S..... |
| H. 4904 | Id. off Panabutan Pt., N. 62° E., 0.30 mile. | .....do..... | ...do..... | 10.23 a. m. | 38 | gn. M., S..... |
| D. 5133 | Id. off Panabutan Pt., N. 52° E., 1.50 miles. | .....do..... | ...do..... | 10.28 a. m. | 38 | gn. M., S..... |
| ..... | Caldera Bay (anch.) | .....do..... | ...do..... | 10.40 a. m.<br>7.30 p. m. | 38<br>..... | gn. M., S.....<br>..... |
| | *Sulu Archipelago, near Basilan Id.* | | | | | |
| D. 5134 | Balukbaluk Id. (N.) S. 59° W., 6.25 miles (6° 44′ 45″ N., 121° 48′ E.). | C. S. 4511; Dec., 1904. | Feb. 7 | 7.14 a. m.<br>7.22 a. m. | 25<br>25 | fne. S.....<br>fne. S..... |
| D. 5134a | Balukbaluk Id. (N.), S. 59° W., 4.90 miles (6° 44′ 12″ N., 121° 46′ 55″ E.). | .....do..... | ...do..... | 7.54 a. m.<br>8.05 a. m. | 34<br>34 | gy. S.....<br>gy. S..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 84.5 | 80 | 50.1 | 1.02477 | 1.02516 | Luc. sdr. (a) | | | | | |
| 83 | 81 | | | | 9′ alb.-Blk.; 2 m. b. | botm | 20 | N. 9° W. | (?) | 4.25 mi. distance given by recorder. |
| 82 | 80 | | | | int. 4 | surf | 20 | S. 6° E. | 0.6 | |
| 82 | 80 | | | | Luc. sdr. (a) | | | | | |
| 82 | 80 | | | | Tnr.-Blish sdr. (b). | | | | | First attempt resulted in loss of all the apparatus used. |
| 81 | 80 | 57.6 | 1.02482 | | Tnr.-Blish sdr. | | | | | Density at 100 fms. 1.02495. |
| 80 | 80 | | | | int. 4 § | 100 fms | 20 8 | S. 31° W. | 1.3 | 193 fms. dredge cable out. |
| 81.5 | 79.5 | 59.2 | 1.02447 | 1.02451 | Luc. sdr. (a) | | | | | |
| 80.5 | 80 | | | | 9′ alb.-Blk | botm | | | | Trawl fouled bottom and carried away. |
| | | | | | 130′ seine | 12 ft | 30 | | | 1 haul. |
| | | | | | dip.; e. l | surf | 2 00 | | | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| | | | | | 175′ seine | | 2 00 | | | |
| | | | | | dyn | 8–15 ft | 2 00 | | | Water brackish. Coral unthrifty. |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| 88 | 79 | | 1.02447 | | Tnr.-Blish sdr. (e). | | | | | |
| 88 | 79 | | | | 9′ Tnr.; m. b | botm | 13 | N. 43° E. | .3 | |
| 85 | 79 | | 1.02447 | | 9′ Tnr.; m. b | botm | 20 | S. 69° W. | .7 | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| 85.5 | 79.5 | | 1.02447 | | Tnr.-Blish sdr. (e). | | | | | |
| 85 | 80 | | | | 9′ Tnr.; m. b | botm | 16 | S. 21° E. | .4 | |
| | | | | | 2′ o. p | surf | 20 | | | Set in tide current at gangway. |
| 82 | 78 | ? | 1.02497 | | Tnr.-Blish sdr. (e). | | | | | Therm. not allowed time to set. |
| 81 | 78 | | | | 9′ Tnr.; m. b | botm | 20 | S. 42° W. | .9 | Ship drifted to position of 5134a while getting apparatus ready. |
| 83 | 78 | 76.2 | | | Tnr.-Blish sdr. (e). | | | | | 15 sec. allowed for therm. to set. |
| 83 | 78 | | | | int. 4 § | 25 fms | 20 2 | N. 26° E. | .9 | 50 fms. dredge cable out. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Vicinity of Jolo.* | | 1908. | | *fms.* | |
| D. 5135 | Jolo Lt., S. 46° W., 11.90 miles (6° 11′ 50″ N., 121° 08′ 20″ E.). | C. S. 4542; Apr., 1903. | Feb. 7 | 2.29 p. m. | 161 | fne. co. S. |
| | | | | 2.50 p. m. | 161 | fne. co. S. |
| | Jolo (anch.) | do | do | 7.30 p. m. | 14 | |
| | do | do | Feb. 8 | 7.30 p. m. | 14 | |
| | Marongas Id., S. side | do | Feb. 10 | 1.30 p. m. | | sctrd. Co., S. |
| | Pangasinan Id., S. Pt. (rf) | do | Feb. 13 | 3.00 p. m. | | sctrd. Co |
| | Jolo (anch.) | do | do | 7.30 p. m. | 11 | |
| D. 5136 | Jolo Lt., S. 37° E., 0.70 mile (6° 04′ 20″ N., 120° 59′ 20″ E.). | do | Feb. 14 | 8.50 a. m. | 22 | S., Sh. |
| | | | | 9.07 a. m. | 22 | S., Sh. |
| D. 5137 | Jolo Lt., S. 61° E., 1.30 miles (6° 04′ 25″ N., 120° 58′ 30″ E.). | do | do | 9.44 a. m. | 20 | S., Sh. |
| | | | | 9.55 a. m. | 20 | S., Sh. |
| D. 5138 | Jolo Lt., S. 19° E., 2.50 miles (6° 06′ N., 120° 58′ 50″ E.). | do | do | 10.50 a. m. | 19 | S., Co. |
| | | | | 10.55 a. m. | 19 | S., Co. |
| D. 5139 | Jolo Lt., S. 51° W., 3.60 miles (6° 06′ N., 121° 02′ 30″ E.). | do | do | 1.02 p. m. | 20 | co. S. |
| | | | | 1.13 p. m. | 20 | co. S. |
| D. 5140 | Jolo Lt., S. 33° W., 6.10 miles (6° 08′ 45″ N., 121° 03′ E.). | do | do | 1.58 p. m. | 76 | fne. co. S. |
| | | | | 2.09 p. m. | 76 | fne. co. S. |
| | Bubuan Id., S. Pt. (rf.) | do | do | 4.00 p. m. | | co. Mss. |
| | Bubuan Id. (anch.) | do | do | 7.30 p. m. | 12 | |
| D. 5141 | Jolo Lt., S. 17° E., 5.50 miles (6° 09′ N., 120° 58′ E.). | do | Feb. 15 | 8.39 a. m. | 29 | co. S. |
| | | | | 8.47 a. m. | 29 | co. S. |
| D. 5142 | Jolo Lt., S. 50° W., 3.90 miles (6° 06′ 10″ N., 121° 02′ 40″ E.). | do | do | 10.26 a. m. | 21 | co. S., Sh. |
| | | | | 10.33 a. m. | 21 | co. S., Sh. |
| D. 5143 | Jolo Lt., S. 50° W., 3.40 miles (6° 05′ 50″ N., 121° 02′ 15″ E.). | do | do | 11.05 a. m. | 19 | co. S. |
| | | | | 11.09 a. m. | 19 | co. S. |
| D. 5144 | Jolo Lt., S. 50° W., 3.40 miles (6° 05′ 50″ N., 121° 02′ 15″ E.). | do | do | 11.19 a. m. | 19 | co. S. |
| | | | | 11.26 a. m. | 19 | co. S. |
| D. 5145 | Jolo Lt., S. 16° E., 0.85 mile (6° 04′ 30″ N., 120° 59′ 30″ E.). | do | do | 1.37 p. m. | 23 | co. S., Sh. |
| | | | | 1.44 p. m. | 23 | co. S., Sh. |
| | *Sulu Archipelago, vicinity of Siasi.* | | | | | |
| D. 5146 | Sulade Id. (E.), N. 18° W., 3.40 miles (5° 46′ 40″ N., 120° 48′ 50″ E.). | C. S. 4542; Apr., 1903. | Feb. 16 | 10.04 a. m. | 24 | co. S., Sh. |
| | | | | 10.11 a. m. | 24 | co. S., Sh. |
| D. 5147 | Sulade Id. (E.), N. 3° E., 8.40 miles (5° 41′ 40″ N., 120° 47′ 10″ E.). | do | do | 11.20 a. m. | 21 | co. S., Sh. |
| | | | | 11.27 a. m. | 21 | co. S., Sh. |
| D. 5148 | Sirun Id. (N.), S. 80° W., 3.80 miles (5° 35′ 40″ N., 120° 47′ 30″ E.). | C. S. 4544; Oct., 1906. | do | 1.00 p. m. | 17 | co. S. |
| | | | | 1.07 p. m. | 17 | co. S. |
| H. 4905 | Sirun Id. (W.), N. 33° E., 2.43 miles (5° 32′ 50″ N., 120° 42′ 15″ E.). | do | Feb. 18 | | 10 | S., Co., Sh. |
| D. 5149 | Sirun Id. (W.), N. 39° E., 2.40 miles (5° 33′ N., 120° 42′ 10″ E.). | do | do | 9.26 a. m. | 10 | Co., Sh. |
| | | | | 9.32 a. m. | 10 | Co., Sh. |
| D. 5150 | Sirun Id. (W.), N. 34° E., 11.7 miles (5° 23′ 20″ N., 120° 35′ 45″ E.). | C. S. 4514; Jan., 1906. | do | 11.37 a. m. | 21 | co. S., Sh. |
| | | | | 11.43 a. m. | 21 | co. S., Sh. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 80.5 | 80 | 57.4 | 1.02457 | | Tnr.-Blish sdr. (e). | | | | | |
| 80.5 | 81 | | | | 12′ Tnr.; m. b. | botm... | 20 | S. 26° W.. | 1.0 | |
| | | | | | dip. e. l. | surf... | 2 00 | | | |
| | | | | | dip. e. l. | surf... | 2 00 | | | |
| | | | | | diving | 4–8 ft... | 3 00 | | | Coral heads taken ashore. |
| | | | | | dyn. | 5–12 ft.. | 2 00 | | | |
| | | | | | dip. e. l. | surf... | 1 30 | | | |
| 84 | 80 | | 1.02489 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 79 | | | | 12′ Agz.; 2 m. b. | botm... | 20 | N. 72° W.. | 0.6 | Lead line carried away. |
| 84 | 80 | | | | Tnr.-Blish sdr. (e). | | | | | |
| 84 | 80 | | | | 12′ Agz.; 2 m. b. | botm... | 20 | N. 27° W.. | 0.6 | |
| 85 | 80 | | | | Tnr.-Blish sdr. (e). | | | | | |
| 85 | 80 | | | | 12′ Agz.; 2 m. b. | botm... | 20 | N. 15° E.. | 0.6 | 1 mud bag carried away. |
| 83 | 80 | | 1.02457 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 80 | | | | 12′ Agz.; m. b. | botm... | 04 | S. 45° E... | 0.2 | |
| 83 | 80 | | 1.02477 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 82 | | | | 12′ Agz. rev.; m. b. | botm... | 20 | N. 70° W.. | 0.8 | |
| | | | | | dyn. | 8–20 ft.. | 1 00 | | | |
| | | | | | dip.; e. l. | surf.... | 1 30 | | | |
| 81 | 78 | | 1.02461 | | Tnr.-Blish sdr. (e). | | | | | |
| 81 | 78 | | | | 12′ Agz.; m. b. | botm... | 18 | N. 13° E.. | 0.5 | |
| 87 | 80 | | 1.02503 | | Tnr.-Blish sdr. (e). | | | | | |
| 88 | 80 | | | | 12′ Agz.; m. b. | botm... | 11 | W..... | 0.5 | 1 bridle-stop carried away. |
| 89 | 80 | | 1.02442 | | Tnr.-Blish sdr. (e). | | | | | Sounding lead carried away. |
| 89 | 80 | | | | 12′ Agz.; m. b. | botm... | 4 | | | Fouled bottom; mud bag torn; no distance made. |
| 91 | 81 | | 1.02514 | | Tnr.-Blish sdr. (e). | | | | | |
| 91 | 81 | | | | 12′ Agz.; m. b. | botm... | 20 | N. 45° W.. | 0.6 | |
| 88 | 77 | | 1.02482 | | Tnr.-Blish sdr. (e). | | | | | |
| 88 | 77 | | | | 12′ Agz.; m. b. | botm... | 15 | S..... | .6 | |
| 82 | 80 | | 1.02468 | | Tnr.-Blish sdr. (e). | | | | | |
| 82 | 81 | | | | 12′ Agz.; m. b. | botm... | 20 | N. 77° W.. | 1.1 | |
| 85 | 80 | | 1.02447 | | Tnr.-Blish sdr. (e). | | | | | |
| 84 | 80 | | | | 12′ Agz.; m. b. | botm... | 20 | S. 72° E... | .4 | |
| 82.5 | 80 | | 1.02523 | | Tnr.-Blish sdr. (e). | | | | | |
| 82.5 | 80 | | | | 12′ Agz.; m. b. | botm... | 18 | S. 51° E... | .7 | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| 81 | 78 | | 1.02509 | | Tnr.-Blish sdr. (e). | | | | | |
| 84 | 78 | | | | 12′ Agz.; m. b. | botm... | 20 | N. 10° W. | .8 | |
| 82 | 78 | | 1.02495 | | Tnr.-Blish sdr. (e). | | | | | |
| 82 | 78 | | | | 12′ Agz.; m. b. | botm... | | | | Net fouled bottom; 1 bridle stop carried away; no distance made. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Sulu Archipelago, Tawi Tawi Group.* | | 1908. | | *fms.* | |
| D. 5151 | Sirun Id. (C.), N. 58° E., 19.3 miles (5° 24′ 40″ N., 120° 27′ 15″ E.). | C. S. 4514; Jan., 1906. | Feb. 18 | 1.02 p. m. | 24 | co. S., Sh |
| | | | | 1.07 p. m. | 24 | co. S., Sh |
| D. 5152 | Pajumajan Id. (W.), S. 2° W., 2 miles (5° 22′ 55″ N., 120° 15′ 45″ E.). | do | do | 3.21 p. m. | 34 | wh. S |
| | | | | 3.28 p. m. | 34 | wh. S |
| | Dos Amigos Bay (anch.) | do | do | 7.30 p. m. | 7 | |
| D. 5153 | Tocanhi Pt., S. 27° E., 2.10 miles (5° 18′ 10″ N., 120° 2′ 55″ E.). | do | Feb. 19 | 9.00 a. m. | 49 | co. S., Sh |
| | | | | 9.08 a. m. | 49 | co. S., Sh |
| D. 5154 | Bakun Pt., S. 11° W., 0.70 mile (5° 14′ 50″ N., 119° 58′ 45″ E.). | H. O. 1852; Apr., 1900. | do | 10.23 a.m. | 12 | co. S |
| | | | | 10.35 a. m. | 12 | co. S |
| D. 5155 | Bakun Pt., N. 70° E., 1.70 miles (5° 13′ 40″ N., 119° 57′ 20″ E.). | do | do | 11.00 a. m. | 12 | co. S |
| | | | | 11.04 a. m. | 12 | co. S |
| | Tataan Pass, Simulac Id. (S. end Basun Channel). | do | do | 2.00 p. m. | | mrgn. co. Rf |
| | | | | 7.00 p. m. | | |
| | Simulac Id. (S. end Basun Channel). | do | Feb. 20 | 8.30 a. m. | | mrgn. co. Rf |
| | | | | 1.30 p. m. | | mrgn. co. Rf |
| | Tataan Pass (anch.) | do | do | 7.30 p. m. | 9 | |
| | Tataan Pass (Simulac Id., rf.) | do | Feb. 21 | 8.30 a. m. | | mrgn. co. Rf |
| D. 5156 | Tinakta Id. (N.), S. 77° W., 3.40 miles (5° 12′ 50″ N., 119° 55′ 55″ E.). | do | do | 8.35 a. m. | 18 | fne. S., Sh |
| | | | | 8.43 a. m. | 18 | fne. S., Sh |
| D. 5157 | Tinakta Id. (N.), S. 80° W., 3.30 miles (5° 12′ 30″ N., 119° 55′ 50″ E.). | do | do | 8.59 a. m. | 18 | fne. S |
| | | | | 9.04 a. m. | 18 | fne. S |
| D. 5158 | Tinakta Id. (N), N. 89° W., 1.90 miles (5° 12′ N., 119° 54′ 30″ E.). | do | do | 9.21 a. m. | 12 | crs. S., Sh |
| | | | | 9.28 a. m. | 12 | crs. S., Sh |
| D. 5159 | Tinakta Id. (N.), N. 82° W., 1.40 miles (5° 11′ 50″ N., 119° 54′ E.). | do | do | 10.04 a. m. | 10 | co. S |
| | | | | 10.08 a. m. | 10 | co. S |
| | Simulac Id. (rf.) | do | do | 1.30 p. m. | | mrgn. co. Rf |
| | Tataan Pass (anch.) | do | do | 7.30 p. m. | 9 | |
| D. 5160 | Tinakta Id. (N.), S. 72° W., 2.75 miles (5° 12′ 40″ N., 119° 55′ 10″ E.). | do | Feb. 22 | 8.26 a. m. | 12 | S |
| | | | | 8:29 a. m. | 12 | S |
| D. 5161 | Tinakta Id. (E.), N. 12° W., 1.80 miles (5° 10′ 15″ N., 119° 53′ E.). | do | do | 9.03 a. m. | 16 | fne. S., blk. Sp |
| | | | | 9.07 a. m. | 16 | fne. S |
| H. 4906 | Tinagta Id. (S), N. 63° E., 4.10 miles (5° 09′ 55″ N., 119° 48′ 55″ E.). | C. S. 4514; Jan., 1906. | do | 9.51 a. m. | 55 | S., brk. Sh |
| D. 5162 | Tinagta Id. (S.), N. 71° W., 5.40 miles (5° 10′ N., 119° 47′ 30″ E.). | do | do | 10.10 a. m. | 230 | |
| | | | | 10.31 a. m. | 230 | crs. S., brk. Sh |
| | Bongao (anch.) | do | do | 7.30 p. m. | 6 | |
| | Bongao (near anch.) | do | do | 7.30 p. m. | | |
| | Sanguisiapo Id. (rf.) | do | Feb. 24 | 9.00 a. m. | | sml. Clmps. Co., S. |
| D. 5163 | Observation Id., N. 79° W., 6.70 miles (4° 59′ 10″ N., 119° 51′ E.). | do | do | 9.36 a. m. | 28 | co. S |
| | | | | 9.43 a. m. | 28 | co. S |
| D. 5164 | Observation Id., S 82° W., 8 miles (5° 01′ 40″ N., 119° 52′ 20″ E.). | do | do | 10.16 a. m. | 18 | gn. M |
| | | | | 10.21 a. m. | 18 | gn. M |
| D. 5165 | Observation Id., N. 70° W., 6.40 miles (4° 58′ 20″ N., 119° 50′ 30″ E.). | do | do | 1.19 p. m. | *9 | Co |
| D. 5166 | Observation Id., N. 20° W., 4.60 miles (4° 56′ 10″ N., 119° 46′ E.). | do | do | 2.54 p. m. | 97 | co. S |
| | | | | 3.05 p. m. | 97 | co. S |
| | Simonor Id., N. side (rf.) | do | do | 3.15 p. m. | | solid Co |
| D. 5167 | Observation Id., N. 11° W., 5.60 miles (4° 55′ 10″ N., 119° 45′ 30″ E.). | do | do | 3.36 p. m. | 110 | Co.* |
| | | | | 3.53 p. m. | 110 | Co.* |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 90 | 80 | ..... | 1.02489 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 90 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 86° E.. | .4 | |
| 87 | 81 | ..... | 1.02457 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 86 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 15 | S. 56° W.. | .5 | |
| ..... | ..... | ..... | ..... | ..... | dip; e. l. | surf.... | 1 30 | ..... | ..... | |
| 84 | 80 | ..... | 1.02437 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 14 | N. 27° W.. | .4 | |
| 85 | 81 | ..... | 1.02437 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 88 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 15 | S. 42° W.. | .3 | |
| 84 | 81 | ..... | 1.02437 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 81 | ..... | ..... | ..... | int. 4 §..... | 8 fms .. | 21 2 | S. 58° W.. | .3 | 20 fms. dredge cable out. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 5–30 ft.. | 3 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 4 gill nets ..... | ..... | ..... | ..... | ..... | Set over night. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 5–40 ft.. | 3 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 5–40 ft.. | 3 00 | ..... | ..... | Channel between reefs. |
| ..... | ..... | ..... | ..... | ..... | dip, e. l..... | surf.... | 30 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–20 ft.. | 3 00 | ..... | ..... | |
| 79 | 79 | ..... | 1.02422 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 79 | 79 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 2 | S. 28° E... | .1 | |
| 79 | 79 | ..... | 1.02422 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 79 | 79 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 5 | S. 29° W.. | .2 | |
| 80 | 79 | ..... | 1.02422 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 80 | 79 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 4 | N. 80° W.. | .1 | |
| 83 | 80 | ..... | 1.02422 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 80 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 2 | S. 14° E... | .2 | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–20 ft.. | 3 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dip. e. l..... | surf.... | 1 00 | ..... | ..... | |
| 85 | 82 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 82 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 3 | S. 67° W.. | .2 | |
| 90 | 82 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 90 | 82 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 1 | S..... | .1 | Net fouled bottom. |
| 94 | 82 | 63.5 | ..... | ..... | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 90 | 82 | 52.9 | 1.02447 | ..... | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 85 | 82 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 15 | S. 9° E.... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dip; e. l..... | surf.... | ..... | ..... | .4 | |
| ..... | ..... | ..... | ..... | ..... | 4 gill nets..... | ..... | ..... | ..... | ..... | Final haul Feb. 24. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–15 ft.. | 2 30 | ..... | ..... | |
| 91 | 77 | ..... | 1.02447 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 91 | 77 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 4 | N. 63° W.. | .3 | |
| 89 | 80 | ..... | 1.02442 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 90 | 80 | ..... | ..... | ..... | 9′ Jn. dr..... | botm .. | 8 | N. 30° E.. | .4 | |
| 84 | 80 | ..... | 1.02495 | ..... | 9′ Jn. dr..... | botm... | 4 | S..... | .2 | No sounding taken. |
| 83 | 81 | 69.4 | 1.02644 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 2 | S. 5° E.... | (?) | Distance recorded .7 mile; 1 bridle stop carried away. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–15 ft.. | 2 00 | ..... ..... | ..... | |
| 82 | 80 | ..... | 1.02406 | ..... | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 82 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 14° W.. | 1.4 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Sulu Archipelago, Tawi Tawi Group*—Continued. | | 1908. | | *fms.* | |
| D. 5168 | Observation Id. N. 17° W., 4.20 miles (4° 56′ 30″ N., 119° 45′ 40″ E.). | C. S. 4514; Jan.,1906. | Feb. 25 | 7.09 a. m. | 80 | co. S |
| | | | | 7.23 a. m. | 80 | co. S |
| | *Sulu Archipelago, vicinity Sibutu Id.* | | | | | |
| ..... | Sitanki (anch.) | C. S. 4722; Apr.,1905. | Feb. 25 | 7 30 p. m. | ..... | ..... |
| ..... | Sitanki (near anch.) | .....do..... | ...do.... | 7.30 p. m. | ..... | ..... |
| ..... | Tumindao Reef S. end (rf.) | .....do..... | Feb. 26 | 9.00 a. m. | ..... | sctrd. Clmps. Co |
| | | | | 1.30 p. m. | ..... | sctrd. Clmps. Co |
| D. 5169 | Sibutu Id. (S. E.), N. 38° E., 8 miles (4° 32′ 15″ N., 119° 22′ 45″ E.). | .....do..... | Feb. 27 | 8.36 a. m. | *10 | co. S |
| ..... | Sitanki wharf | .....do..... | ...do.... | 10.00 a. m. | ..... | S., M., Co |
| D. 5170 | Sibutu Id. (S. end), N. 38° E., 13.50 miles (4° 28′ N., 119° 19′ 30″ E.). | .....do..... | ...do.... | 11.06 a. m. | 128 | crs. S |
| | | | | 11.17 a. m. | 128 | crs. S |
| H. 4907 | Sibutu Id. (S. end), N. 10° E., 13.50 miles (4° 26′ N., 119° 25′ 30″ E.). | .....do..... | ...do.... | 12.51 p. m. | 850 | gn. M |
| D. 5171 | Omapui Id. (W.), S. 22° W., 12 miles (5° 05′ N., 119° 28′ E.). | .....do..... | Feb. 28 | 3.21 p. m. | 250 | fne. co. S |
| | | | | 3.47 p. m. | 250 | fne. co. S |
| | *Sandakan and vicinity.* | | | | | |
| ..... | Sandakan (near anch.) | B. A. 950... | Feb. 29 | 8.15 p. m. | 7 | ..... |
| ..... | Sandakan (anch.) | .....do..... | ...do.... | 8.15 p. m. | 7 | ..... |
| | | | Mar. 1 | 8.00 p. m. | 7 | ..... |
| ..... | Sandakan (beach above fishermen's village). | .....do..... | Mar. 2 | 2.00 p. m. | ..... | S., R |
| | *Vicinity of Jolo.* | | | | | |
| ..... | Usada Id., S. end (rf.) | C. S. 4722; Apr.,1905. | Mar. 5 | 9.00 a. m. | ..... | sctrd. Co |
| D. 5172 | Jolo Lt., E., 24.75 miles (6° 03′ 15″ N., 120° 35′ 30″ E.). | .....do..... | ...do.... | 10.06 a. m. | 318 | fne. S., Sh |
| | | | | 10.31 a. m. | 318 | fne. S., Sh |
| H. 4908 | Jolo Lt., N. 78° E., 7.50 miles (6° 02′ 30″ N., 120° 52′ 20″ E.). | C. S. 4542; Apr.,1903. | ...do.... | 2.27 p. m. | 171 | Sh., Co |
| D. 5173 | Jolo Lt., N. 82° E., 6.75 miles (6° 02′ 55″ N., 120° 53′ E.). | .....do..... | ...do.... | 2.39 p. m. | 186 | Sh., Co |
| | | | | 2.57 p. m. | 186 | Sh., Co |
| D. 5174 | Jolo Lt., E. 2.60 miles (6° 03′ 45″ N., 120° 57′ E.). | .....do..... | ...do.... | 3.46 p. m. | 20 | crs. S |
| | | | | 3.51 p. m. | 20 | crs. S |
| ..... | Jolo (anch.) | .....do..... | ...do.... | 4.00 p. m. | ..... | sctrd. Co |
| ..... | Jolo (rf. near anch., north) | .....do..... | Mar. 6 | 9.00 a. m. | ..... | Co., S |
| ..... | Jolo (beach, west of town) | .....do..... | ...do.... | 2.00 p. m. | ..... | S., Co., grassy |
| ..... | Jolo (near anch.) | .....do..... | ...do.... | 4.00 p. m. | 10 | S |
| ..... | Jolo (west of anch.) | .....do..... | Mar. 7 | 9.00 a. m. | ..... | S., Co. (staghorn Mss.). |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 79 | 79 | ..... | 1.02386 | ..... | Luc. sdr. (e).. | ..... | ..... | ..... | ..... | |
| 79.5 | 79 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 3 | S..... | (?) | Net fouled bottom. |
| ..... | ..... | ..... | ..... | ..... | dip; e. l..... | surf.... | 1 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 4 gill nets..... | ..... | ..... | ..... | ..... | Set over night. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 9–15ft.. | 3 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 9–15ft.. | 3 00 | ..... | ..... | |
| 81 | 79 | ..... | 1.02509 | ..... | 9′ Jn. dr..... | botm... | 5 | S. 11° W.. | .2 | No sounding. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 12–15ft. | 1 00 | ..... | ..... | |
| 0.5 | 78 | ..... | 1.02426 | ..... | Luc. sdr. (e).. | ..... | ..... | ..... | ..... | |
| 81 | 78 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 2 | S. 27° E... | (?) | Distance recorded, 0.5 mile; 1 bridle stop carried away. |
| 82 | 79 | ..... | ..... | ..... | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 76 | 83 | 53.5 | 1.02373 | 1.02462 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 76 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | S. 45° W.. | (?) | Distance not obtainable on account of fog. |
| ..... | ..... | ..... | ..... | ..... | 2′ o. p..... | surf.... | 15 | ..... | ..... | Towed from steam launch. |
| ..... | ..... | ..... | ..... | ..... | dip; e. l..... | surf.... | 1 30 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dip; e. l..... | surf.... | 1 30 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 130′ seine..... | 12ft.... | 3 30 | ..... | ..... | 6 hauls. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–12ft.. | 2 00 | ..... | ..... | |
| 84 | 82 | ..... | 1.02447 | ..... | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | Temperature at 277 fms. 53.3. Density at 277 fms. 1.02462. |
| 85 | 82 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm .. | 20 | N. 47° W.. | 1.0 | Net slightly damaged. |
| 96 | 84 | ..... | ..... | ..... | Tnr.-Blish sdr. (b). | ..... | ..... | ..... | ..... | |
| 99 | 83 | ..... | 1.02518 | ..... | Tnr.-Blish sdr. (b). | ..... | ..... | ..... | ..... | |
| 93 | 83 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 6 | E..... | (?) | Distance recorded 0.7 mile. |
| 100 | 82 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 100 | 82 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 6 | N. 58° E... | .4 | |
| ..... | ..... | ..... | ..... | ..... | 4 gill nets..... | ..... | ..... | ..... | ..... | Hauled and shifted about 7 p. m.; not found on following morning. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 8ft..... | 3 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 130′ seine..... | 4ft..... | 2 00 | ..... | ..... | 4 hauls; 1 at mouth of stream. |
| ..... | ..... | ..... | ..... | ..... | 4 traps..... | botm... | ..... | ..... | ..... | Hauled following morning and at 1 p. m. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 4–10ft.. | 3 00 | ..... | ..... | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Sulu Sea, S. E. of Cagayanes Ids.* | | 1908. | | *fms.* | |
| D. 5175 | Manucan Id. (E.), N. 45° W., 23.25 miles (9° 21′ N., 121° 37′ 45″ E.). | C. S. 4717; Feb.,1903. | Mar. 8 | 7.22 p. m. | * | |
| | *Manila Bay.* | | | | | |
| ..... | Manila Bay (Luneta beach).. | C. S. 4240; Feb.,1907. | Mar. 16 | 9.00 a. m. | ..... | S., M. |
| ..... | Cavite (Sangley Pt. beach).. | .....do..... | Mar. 23 | 9.00 a. m. | ..... | S. |
| | *Verde Id. Passage.* | | | | | |
| D. 5176 | Escarceo Lt., S. 57° E., 7 miles (13° 35′ 15″ N., 120° 53′ 20″ E.). | C. S. 4240; Feb.,1907. | Mar. 24 | 7.01 p. m. | *260 | *S. |
| D. 5177 | Escarceo Lt., S. 53° E., 5.80 miles (13° 35′ N., 120° 54′ 36″ E.). | .....do..... | ...do.... | 7.33 p. m. | *260 | *S. |
| | *Vicinity of Romblon.* | | | | | |
| D. 5178 | Pt. Origon (N.), S. 5° E., 2.30 miles (12° 43′ N., 122° 06′ 15″ E.). | C. S. 4714; June,1906. | Mar. 25 | 8.35 a. m. | 73 | fne. S. |
| | | | | 8.51 a. m. | 78 | fne. S. |
| D. 5179 | Romblon Lt., S. 56° E., 4.50 miles (12° 38′ 15″ N., 122° 12′ 30″ E.). | .....do..... | ...do.... | 10.41 a. m. | 37 | hrd. S. |
| | | | | 10.49 a. m. | 37 | hrd. S. |
| ..... | Romblon Harbor (rf. S. of Agbatan Pt.). | C. S. 4442; Mar.,1907. | ...do.... | 2.00 p. m. | ..... | Mss. staghorn Co. |
| ..... | Romblon (anch.) | .....do..... | ...do.... | 8.00 p. m. | 20 | ..... |
| ..... | Romblon (beach at Binagon and Agpatan Pts.). | .....do..... | Mar. 26 | 9.00 a. m. | ..... | S., Co. |
| ..... | Romblon (rf. E. of Sabang Pt.). | .....do..... | ...do..... | 9.00 a. m. | ..... | mrgn. Clmps. Co. |
| ..... | Romblon (rf. E. side Rosas Pt.). | .....do..... | ...do..... | 1.00 p. m. | ..... | co. Clmps |
| D. 5180 | Romblon Lt., N. 6° 30′ E., 7.10 miles (12° 28′ 30″ N., 122° 15′ E.). | C. S. 4715; Apr., 1907. | ...do..... | 7.32 p. m. | ..... | ..... |
| | *Off eastern Panay.* | | | | | |
| D. 5181 | Antonia Id. (S.), S. 63° W., 6.60 miles (11° 36′ 40″ N., 123° 26′ 35″ E.). | C. S. 4417; Feb., 1905. | Mar. 27 | 8.39 a. m. | 26 | M., fne. S. |
| | | | | 8.46 a. m. | 26 | M., fne. S. |
| D. 5182 | Antonia Id. (S.), N., 43° W., 3.70 miles (11° 30′ 40″ N., 123° 23′ 20″ E.). | .....do..... | ...do..... | 9.43 a. m. | 24 | fne. S., M. |
| | | | | 9.51 a. m. | 24 | fne. S., M. |
| | *Between Panay and Negros.* | | | | | |
| D. 5183 | Lusaran Lt., S. 29° E., 4 miles (10° 32′ 48″ N., 122° 26′ E.). | C. S. 4718; Dec., 1906. | Mar. 30 | 10.27 a. m | 96 | sft. gn. M. |
| | | | | 10.51 a. m. | 96 | sft. gn. M. |
| D. 5184 | Lusaran Lt., N. 22° E., 11.25 miles (10° 18′ 30″ N., 122° 23′ 30″ E.). | .....do..... | ...do..... | 1.09 p. m. | 565 | gn. M. |
| | | | | 1.53 p. m. | 565 | gn. M. |
| D. 5185 | Lusaran Lt., N. 23° E., 25.50 miles (10° 05′ 45″ N., 122° 18′ 30″ E.). | .....do..... | ...do..... | 4.39 p. m. | 638 | gn. M. |
| | | | | 5.26 p. m. | 638 | gn. M. |
| D. 5186 | Lusaran Lt., N. 20° E., 37.80 miles (9° 53′ 30″ N., 122° 15′ 30″ E.). | .....do..... | ...do..... | 8.01 p. m. | ..... | ..... |
| | *Tanon Strait, east coast of Negros.* | | | | | |
| D. 5187 | Apo Id., S. 21° W., 12.50 miles (9° 16′ 45″ N., 123° 21′ 15″ E.). | C. S. 4718; Dec., 1906. | Mar. 31 | 1.06 p. m. | 225 | sft. gn. M. |
| | | | | 1.26 p. m. | 225 | sft. gn. M. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 82 | 82 | ..... | ..... | ..... | Int. 4..... | surf.... | 0 20 | N. 7° E... | 1.3 | Chart indicates no bottom at 70 fms. |
| .... | .... | ..... | ..... | ..... | 130′ seine..... | 4ft..... | 1 30 | ..... | ..... | 4 hauls. |
| .... | .... | ..... | ..... | ..... | 130′ seine..... | 10ft.... | 2 30 | ..... | ..... | 5 hauls. |
| 80 | 79 | ..... | ..... | ..... | Int. 4..... | surf.... | 0 21 | S. 72° E... | 1.0 | |
| 80 | 79 | ..... | ..... | ..... | Int. 4 §..... | 25 fms.. | 0 20<br>1.5 | E..... | 0.9 | 40 fms. dredge cable out. |
| 80 | 80 | ..... | 1.02515 | 1.02516 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | Therm. failed to trip. |
| 80 | 80 | ..... | ..... | ..... | 12′ Agz.; 3 m.b. | botm... | 0 20 | N. 84° W.. | 2.0 | |
| 81 | 81 | 75.7 | ..... | ..... | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 81 | 81 | ..... | ..... | ..... | 12′ Agz.; 3 m.b. | botm... | 0 15 | N. 81° W.. | 1.3 | |
| .... | .... | ..... | ..... | ..... | dyn..... | 8–15ft.. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dip; e. l..... | surf.... | 2 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 150′ seine..... | ..... | ..... | ..... | ..... | Several hauls. |
| .... | .... | ..... | ..... | ..... | dyn..... | 10–20 ft. | 3 00 | ..... | ..... | Few shots made. |
| .... | .... | ..... | ..... | ..... | dyn..... | 8–15 ft.. | 1 30 | ..... | ..... | Interrupted by rain. |
| 79 | 80 | ..... | 1.02530 | ..... | Int. 4..... | surf.... | 20 | S. 5° E.... | (?) | |
| 80 | 80 | ..... | 1.02544 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 80 | 80 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 4 | S. 46° W.. | .3 | |
| 81 | 80 | ..... | 1.02515 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 80 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 8 | S. 39° W.. | .7 | Veered from 43 to 55 fms. |
| 83 | 81 | 63.4 | 1.02489 | 1.02551 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 84 | 81 | ..... | ..... | ..... | 12′ Agz.; 3 m.b. | botm... | 20 | S. 78° W.. | .7 | Veered from 192 to 250 fms. during haul. |
| 90 | 83 | 49.8 | 1.02489 | 1.02505 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 92 | 82 | ..... | ..... | ..... | 12′ Agz.; 3 m.b. | botm... | 20 | S. 52° W.. | 2.0 | |
| 81 | 82 | 49.8 | 1.02481 | 1.02492 | Luc. sdr. (b).. | ..... | ..... | ..... | ..... | |
| 81 | 82 | ..... | ..... | ..... | Int. 4 §..... | 550 fms. | 20<br>48 | S. 64° W.. | 2.5 | 1,000 fms. dredge cable out. |
| 81 | 80 | ..... | 1.02530 | ..... | Int. 4..... | surf.... | 20 | S. 4° W... | .8 | |
| 87 | 81 | 53.6 | 1.02475 | 1.02492 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 87 | 81 | ..... | ..... | ..... | 9′ Jn. dr..... | botm... | 11 | S. 79° W.. | .6 | Lashing slipped; catch lost. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Tanon Strait, east coast of Negros*—Continued. | | 1908. | | *fms.* | |
| ..... | Port Bais (anch.)..... | C. S. 4718; Dec., 1906. | Mar. 31 | 8.00 p. m. | 9 | ..... |
| D. 5188 | Pescador Id., N. 16° E., 14 miles (9° 44′ N., 123° 14′ 20″ E.). | .....do..... | Apr. 1 | 10.21 a. m.<br>10.44 a. m. | 299<br>299 | gn. M.....<br>gn. M..... |
| D. 5189 | Pescador Id., N. 72° E., 3.30 miles (9° 56′ 30″ N., 123° 15′ E.). | .....do..... | ...do..... | 1.08 p. m.<br>1.33 p. m. | 300<br>300 | gn. M.....<br>gn. M..... |
| D. 5190 | Pescador Id., S. 9° E., 10.70 miles (10° 08′ 15″ N., 123° 16′ 45″ E.). | .....do..... | ...do ..... | 4.16 p. m.<br>4.39 p. m. | 295<br>295 | gn. M.....<br>gn. M..... |
| ..... | Guijulugan (beach)..... | .....do..... | Apr. 2 | 8.00 a. m. | ..... | S., G., grassy..... |
| D. 5191 | Refugio Id. (S.), S. 74° W., 5.50 miles (10° 29′ 45″ N., 123° 31′ 15″ E.). | .....do..... | ...do..... | 2.58 p. m.<br>3.26 p. m. | 258<br>258 | gn. M.....<br>gn. M..... |
| ..... | Balamban (anch.)..... | .....do..... | ...do..... | 8.00 p. m. | 12 | S..... |
| | *Off northern Cebu Id.* | | | | | |
| D. 5192 | Jilantaguan Id. (E.), N. 13° W., 3 miles (11° 09′ 15″ N., 123° 50′ E.). | C. S. 4718; Dec., 1906. | Apr. 3 | 9.28 a. m.<br>9.40 a. m. | 32<br>32 | gn. S.....<br>gn. S..... |
| D. 5193 | Chocolate Id., N. 77° E., 8 miles (11° 16′ 45″ N., 123° 55′ 45″ E.). | .....do..... | ...do..... | 11.03 a. m.<br>11.12 a. m. | 71<br>71 | gn. M.....<br>gn. M..... |
| D. 5194 | Chocolate Id., N. 66° W., 8 miles (11° 15′ 30″ N., 124° 11′ E.). | .....do..... | ...do..... | 1.58 p. m.<br>2.15 p. m. | 148<br>148 | gn. M.....<br>gn. M..... |
| D. 5195 | Capitancillo Id. Lt., N., 11.75 miles (10° 47′ N., 124° 06′ 30″ E.). | .....do..... | ...do..... | 7.03 p. m. | ..... | ..... |
| D. 5196 | Capitancillo Lt., N. 5° 30′ W., 14.30 miles (10° 44′ 30″ N., 124° 07′ 30″ E.). | .....do..... | ...do..... | 7.42 p. m. | ..... | ..... |
| ..... | Mactan Cove, S. E. shore (rf.). | .....do..... | Apr. 6 | 10.00 a. m. | ..... | mrgn. Clmps. Co.. |
| ..... | Mactan Id. (shore, opposite Cebu). | .....do..... | Apr. 7 | 8.00 a. m. | ..... | honey-combed Rf. |
| | *Vicinity western Bohol.* | | | | | |
| ..... | Mantacao Id., S. side (rf.)... | C. S. 4718; Dec., 1906. | Apr. 8 | 3.00 p. m. | ..... | mrgn. Mss. Co.... |
| ..... | Mantacao Id., S. side (beach). | .....do..... | ...do..... | 3.00 p. m. | ..... | S..... |
| ..... | Mantacao Id. (anch.)..... | .....do..... | ...do..... | 8.00 p. m. | 10 | ..... |
| D. 5197 | Baliscasag Id., S., 22 miles (9° 52′ 30″ N., 123° 40′ 45″ E.). | .....do..... | Apr. 9 | 8.34 a. m.<br>8.55 a. m. | 174<br>174 | gn. M.....<br>gn. M..... |
| D. 5198 | Baliscasag Id., S. 6° E., 10.25 miles (9° 40′ 50″ N., 123° 39′ 45″ E.). | .....do..... | ...do..... | 11.05 a. m.<br>11.25 a. m. | 220<br>220 | gn. M.....<br>gn. M..... |
| ..... | Tagbilaran Channel (beach on Bohol side near S. anch.). | .....do..... | ...do..... | 3.00 p. m. | ..... | S., grassy..... |
| D. 5199 | Pamilacan Id. (E.), S. 61° W., 6.25 miles (9° 31′ 50″ N., 124° 40″ E.). | C. S. 4719; Aug., 1904. | ...do..... | 7.36 p. m. | ..... | ..... |
| D. 5200 | Pamilacan Id. (E.), S. 66° W., 7.25 miles (9° 31′ 50″ N., 124° 02′ 05″ E.). | .....do..... | ...do..... | 8.07 p. m. | ..... | ..... |
| | *Sogod Bay, southern Leyte Id.* | | | | | |
| D. 5201 | Limasaua Id. (E.), S. 1° E., 14.80 miles (10° 10′ N., 125° 04′ 15″ E.). | C. S. 4719; Aug., 1904. | Apr. 10 | 8.24 a. m.<br>9.13 a. m. | 554<br>554 | gy. S., M.....<br>gy. S., M..... |
| D. 5202 | Limasaua Id. (E.), S. 2° E., 16.70 miles (10° 12′ N., 125° 04′ 10″ E.). | .....do..... | ...do..... | 10.31 a. m.<br>11.07 a. m. | 502<br>502 | gy. M.....<br>gy. M..... |
| D. 5203 | Limasaua Id. (S.), S. 38° W., 5.50 miles (9° 58′ N., 125° 07′ 40″ E.). | .....do..... | ...do..... | 2.21 p. m.<br>3.47 p. m. | 775<br>775 | gn. M.....<br>gn. M..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dip; e. l. | surf. | 3 30 | | | Brackish water. |
| 82.5 | 81 | 62.6 | 1.02475 | 1.02502 | Luc. sdr. (a). | | | | | |
| 84.5 | 81 | | | | 12 Agz.; 3 m.b. | botm. | 20 | N. 63° W. | .6 | |
| 85 | 82 | 62.8 | 1.02468 | 1.02495 | Luc. sdr. (a). | | | | | |
| 89 | 82 | | | | 12 Agz.; 3 m.b. | botm. | 20 | N. 70° E. | 1.0 | |
| 92.5 | 83 | 63 | 1.02468 | 1.02482 | Luc. sdr. (a). | | | | | |
| 90 | 83 | | | | int. 4 § | 250 fms. | 20 20′ | N. 43° W. | .8 | 400 fms. dredge cable out. |
| | | | | | 150′ seine | 9 ft. | 3 00 | | | 8 hauls. |
| 93 | 83 | 62.8 | 1.02497 | 1.02516 | Luc. sdr. (a). | | | | | |
| 91.5 | 83 | | | | 12′ Agz.; 3 m.b. | botm. | 20 | S. 88° W. | .9 | |
| | | | | | dip; e. l. | surf. | 1 30 | | | |
| 82 | 82 | | 1.02518 | | Tnr.-Blish sdr. (b). | | | | | |
| 82 | 82 | | | | 9′ Jn. dr. | botm. | 3 | N. 45° W. | .2 | |
| 86 | 82 | | 1.02503 | | Tnr.-Blish sdr. (e). | | | | | |
| 90 | 82 | | | | 12′ Agz.; 3 m.b. | botm. | 20 | N. 44° W. | 1.3 | |
| 85 | 83 | 56.5 | 1.02447 | 1.02597 | Luc. sdr. (a). | | | | | |
| 84 | 83 | | | | 12′ Agz.; 3 m.b. | botm. | 20 | S. 25° W. | .8 | |
| 82.5 | 84 | | 1.02514 | | int. 4 | surf. | 20 | S. 22° 30′ E. | 1.5 | No sounding. |
| 81.5 | 82 | | 1.02518 | | int. 4 | surf. | 20 | | | Ship steered in circle. |
| | | | | | dyn. | 10–20 ft. | 2 00 | | | High water. |
| | | | | | poison | | 2 00 | | | Tide pools. |
| | | | | | dyn. | 10–30 ft. | 2 30 | | | |
| | | | | | 130′ seine | 5 ft. | 2 30 | | | 6 hauls. |
| | | | | | dip; e. l. | surf. | 1 00 | | | |
| 89 | 81 | 54.3 | 1.02489 | 1.02513 | Luc. sdr. (a). | | | | | |
| 91 | 81 | | | | 12′ Agz.; 3 m.b. | botm. | 20 | N. 58° W. | 1.0 | |
| 84 | 81 | 53.9 | 1.02434 | 1.02500 | Luc. sdr. (a). | | | | | |
| | | | | | 12′ Agz.; 3 m.b. | botm. | 20 | S. 54° W. | 1.1 | |
| | | | | | 130′ seine | 6 ft. | 1 00 | | | 3 hauls. |
| 83 | 79 | | 1.02530 | | int. 4 | surf. | 20 | E. | .6 | |
| 82.5 | 79 | | 1.02468 | | int. 4 | surf. | 18 | | | Ship steered in circle. |
| 80 | 79 | 52.8 | 1.02440 | 1.02497 | Luc. sdr. (a). | | | | | |
| 85 | 80 | | | | 12′ Agz.; 3 m.b. | botm. | 20 | S. 24° W. | 1.5 | Veered 112 fms. cable during haul. |
| 80 | 80 | (?) | 1.02440 | 1.02457 | Luc. sdr. (a). | | | | | Therm. failed to trip. |
| 79 | 80 | | | | 12′ Agz.; 3 m.b. | botm. | 20 | (?) | (?) | |
| 82 | 80 | 52.9 | 1.02468 | 1.02606 | Luc. sdr. (a). | | | | | |
| 83 | 81 | | | | 12′ Agz.; 3 m.b. | botm. | 31 | N. 72° W. | 2.7 | Veered from 1,200 to 1,330 fms. during haul. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Off east coast of Leyte Id.* | | 1908. | | *fms.* | |
| D. 5204 | Mariquitdaquit Id., N. 88° E., 3.50 miles (11° 04′ 18″ N., 125° 05′ 30″ E.). | C. S. 4719; Aug., 1904. | Apr. 11 | 9.48 a. m. | 15 | gn. M. |
| ..... | Tacloban (anch.) | ....do.... | Apr. 12 | 8.00 p. m. | 3 | M., S. |
| ..... | Tacloban (near anch.) | ....do.... | ...do.... | 8.00 p. m. | ..... | ..... |
| D. 5205 | Caguayan Pt., N. 2° E., 0.70 mile (11° 19′ 30″ N., 124° 58′ 05″ E.). | ....do.... | Apr. 13 | 9.28 a. m. | 8 | ..... |
| ..... | San Januico Strait, N. of Nababuy Id. (rf.).[a] | ....do.... | ...do.... | 1.00 p. m. | ..... | staghorn Co., R. |
| | *Off western Samar.* | | | | | |
| D. 5206 | Badian Id. (N.), N. 27° E., 5.75 miles (11° 31′ 40″ N., 124° 42′ 40″ E.). | C. S. 4420; May, 1907. | Apr. 14 | 9.54 a. m. | 32 | gn. M. |
| | | | | 10.02 a. m. | 32 | gn. M. |
| D. 5207 | Badian Id. (N.), S. 74° E., 4.70 miles (11° 38′ 05″ N., 124° 40′ 45″ E.). | ....do.... | ...do.... | 11.22 a. m. | 35 | gn. M., S. |
| | | | | 11.27 a. m. | 35 | gn. M., S. |
| D. 5208 | Taratara Id. (N.), S. 67° 30′ E., 4.10 miles (11° 45′ 53″ N., 124° 42′ 50″ E.). | C. S. 4451; June, 1904. | ...do.... | 12.53 p. m. | 26 | sft. gn. M. |
| | | | | 12.59 p. m. | 26 | sft. gn. M. |
| D. 5209 | Taratara Id. (N.), S. 53° W., 1.80 miles (11° 45′ 25″ N., 124° 48′ 05″ E.). | ....do.... | ...do.... | 2.03 p. m. | 20 | gn. M. |
| | | | | 2.13 p. m. | 20 | gn. M. |
| | | | | 2.13 p. m. | 20 | ..... |
| ..... | Catbalogan (Pamuntangan Rf.). | ....do.... | ...do.... | 4.00 p. m. | ..... | sft. Co., S. |
| ..... | Catbalogan (near anch.) | ....do.... | ...do.... | 7.00 p. m. | 5 | ..... |
| ..... | Catbalogan (beach above Aguada Pt.). | ....do.... | Apr. 15 | 8.00 a. m. | ..... | S., M. |
| ..... | Catbalogan (Pamuntangan Rf.). | ....do.... | ...do.... | 8.00 a. m. | ..... | sft. Co., algæ. |
| ..... | Catbalogan (Quinituay Rf.) | ....do.... | ...do.... | 1.30 p. m. | ..... | staghorn Clmps., Co., R. |
| ..... | Catbalogan (Lutao Rf. and Anas Pt.). | ....do.... | Apr. 16 | 8.30 a. m. | ..... | Co., R. |
| ..... | Catbalogan (Quinituay Rf., beach). | ....do.... | ...do.... | 8.30 a. m. | ..... | S., Co. |
| ..... | Catbalogan (Quinituay Rf.) | ....do.... | ...do.... | 2.30 p. m. | ..... | staghorn Mss., Co., R. |
| D. 5210 | Limbancauayan Id. (E.), N. 1° W., 3.60 miles (11° 49′ 55″ N., 124° 28′ 05″ E.). | C. S. 4420; May, 1907. | Apr. 17 | 10.17 a. m. | 50 | fne. gy. S. |
| | | | | 10.30 a. m. | 50 | fne. gy. S. |
| | | | | 10.30 a. m. | 50 | ..... |
| | *East of Masbate Id.* | | | | | |
| D. 5211 | Panalangan Pt., Talajit Id., N. 33° E., 5.25 miles (11° 51′ 35″ N., 124° 14′ E.). | C. S. 4715; Apr., 1907. | Apr. 17 | 1.05 p. m. | 155 | gn. M., S. |
| | | | | 1.20 p. m. | 155 | ..... |
| | | | | 1.20 p. m. | 155 | ..... |
| ..... | Cataingan Bay (upper rf., inside Dumurug Pt.). | C. S. 4455; Sept., 1904. | ...do.... | 4.00 p. m. | ..... | S., sctrd. Clmps. staghorn Co. |
| ..... | Cataingan Bay, Dumurug Pt. (beach). | ....do.... | Apr. 18 | 8.30 a. m. | ..... | ..... |
| ..... | Cataingan Bay (upper rf., inside Dumurug Pt.). | ....do.... | ...do.... | 8.30 a. m. | ..... | S., sctrd. Clmps. staghorn Co. |
| | | | Apr. 19 | 3.00 p. m. | ..... | S., sctrd. Clmps. staghorn Co. |
| ..... | Cataingan Bay (anch.) | ....do.... | ...do.... | 8.00 p. m. | 20 | ..... |
| D. 5212 | Panalangan Pt., S. 54° 30′ E., 14.50 miles (12° 04′ 15″ N., 124° 04′ 36″ E.). | C. S. 4715; Apr., 1907. | Apr. 20 | 8.29 a. m. | 108 | gy. S., M. |
| | | | | 8.45 a. m. | 108 | gy. S., M. |
| D. 5213 | Destacado Id. (S.), N. 87° E., 8.50 miles (12° 15′ N., 123° 57′ 30″ E.). | ....do.... | ...do.... | 10.38 a. m. | 80 | S., M., Sh. |
| | | | | 10.47 a. m. | 80 | S., M., Sh. |
| ..... | Masbate (rf. N. of town) | ....do.... | ...do.... | 3.00 p. m. | ..... | Co., R. |

[a] One boat made collections up the Silaga River for a few miles.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 84 | 82 | ..... | 1.02391 | ..... | 12′ Agz.; 3 m.b. | botm... | 21 | N. 57° W.. | 1.0 | Sounding with hand lead. |
| .... | .... | ..... | ..... | ..... | dip; e. l..... | surf.... | ..... | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 2 gill nets..... | ..... | ..... | ..... | ..... | Hauled following morning. |
| 84 | 83 | ..... | 1.02448 | ..... | 12′ Agz.; 3 m.b. | botm... | ..... | ..... | ..... | Fouled bottom; trawl lost; mud bag only recovered; sounding with hand lead. |
| .... | .... | ..... | ..... | ..... | dyn..... | 3–10 ft.. | 3 00 | ..... | ..... | Brackish water. |
| 83 | 83 | ..... | 1.02406 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 18° W.. | .7 | |
| 86 | 84 | ..... | 1.02395 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 15 | N. 16° E... | .5 | |
| 84 | 84 | ..... | 1.02483 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 27° E... | .6 | |
| 81 | 84 | ..... | 1.02493 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | S. 28° E... | .6 | Mud bag lost. |
| 81 | 84 | ..... | ..... | ..... | K2..... | surf.... | 10 | S. 28° E... | .3 | Towed alongside. |
| .... | .... | ..... | ..... | ..... | dyn..... | 12–15 ft.. | 1 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 2 gill nets..... | ..... | ..... | ..... | ..... | Finally hauled on Apr. 17. |
| .... | .... | ..... | ..... | ..... | 130′ seine..... | 6 ft..... | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 12–15 ft.. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 4 20 ft.. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 8–30 ft.. | 3 00 | ..... | ..... | Coral unthrifty. |
| .... | .... | ..... | ..... | ..... | 150′ seine..... | 6 ft..... | ..... | ..... | ..... | 2 hauls. |
| .... | .... | ..... | ..... | ..... | dyn..... | 4–30 ft.. | 2 30 | ..... | ..... | 2 boats used. |
| 82 | 84 | 76.3 | 1.02406 | 1.02523 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 11 | N. 1° W... | .2 | |
| 83 | 83 | ..... | ..... | ..... | K2..... | surf.... | 11 | N. 1° W... | .2 | Towed alongside. |
| 83 | 84 | 56.6 | 1.02482 | 1.02509 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | int. 4 § ..... | (?)..... | 20 | N. 31° W.. | 1.7 | 200 fms. dredge cable out. |
| | | | | | | | 10 | | | |
| 84 | 84 | ..... | ..... | ..... | K2..... | surf.... | 20 | N. 31° W.. | 1.7 | Towed alongside. |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–10 ft.. | 1 30 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 150′ seine..... | ..... | 2 30 | ..... | ..... | 5 hauls. |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–10 ft.. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–10 ft.. | 1 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dip; e. l..... | surf.... | ..... | ..... | ..... | |
| 82 | 80 | 59.9 | 1.02467 | 1.02476 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 83 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 21° W.. | .9 | Veered 8 fms. during haul. |
| 82 | 81 | ..... | 1.02489 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 22° W.. | .8 | |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–25 ft.. | 2 00 | ..... | ..... | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *East of Masbate Id.*—Cont'd. | | 1908. | | *fms.* | |
| ..... | Masbate (near anch.)..... | C. S. 4715; Apr., 1907. | Apr. 20 | 5.30 p. m. | ..... | ..... |
| | | | | 5.30 p. m. | ..... | ..... |
| ..... | Masbate (anch.)..... | .....do..... | .....do.... | 8.00 p. m. | 20 | ..... |
| D. 5214 | Palanog Lt., Masbate, S. 17° W., 2.60 miles (12° 25′ 18″ N., 123° 37′ 15″ E.). | .....do..... | Apr. 21 | 8.59 a. m. | 218 | gn. M..... |
| | | | | 9.19 a. m. | 218 | gn. M..... |
| D. 5215 | Palanog Lt., S. 5° 30′ E., 8.50 miles (12° 31′ 30″ N., 123° 35′ 24″ E.). | .....do..... | ...do.... | 10.27 a. m. | 604 | gn. M..... |
| | | | | 11.32 a. m. | 604 | gn. M..... |
| | *Between Burias and Luzon.* | | | | | |
| ..... | Port San Miguel (beach)..... | C. S. 4454; May, 1906. | Apr. 21 | 3.00 p. m. | ..... | S..... |
| ..... | Port San Miguel (rf. N. of Puro Id.). | .....do..... | ...do.... | 3.00 p. m. | ..... | S., mrgn. Clmps. Co. |
| ..... | Port San Miguel (anch.)..... | .....do..... | ...do.... | 7.00 p. m. | 19 | ..... |
| D. 5216 | Anima Sola Id., N. 44° W., 29.50 miles (12° 52′ N., 123° 23′ 30″ E.). | C. S. 4715; Apr., 1907. | Apr. 22 | 8.19 a. m. | 215 | gn. M..... |
| | | | | 8.36 a. m. | 215 | gn. M..... |
| D. 5217 | Anima Sola Id., N. 42° W., 17.30 miles (13° 20″ N., 123° 14′ 15″ E.). | .....do..... | ...do.... | 10.31 a. m. | 105 | crs. gy. S..... |
| | | | | 10.44 a. m. | 105 | crs. gy. S..... |
| D. 5218 | Anima Sola Id. (E.), N. 10° W., 2 miles (13° 11′ 15″ N., 123° 02′ 45″ E.). | .....do..... | ...do.... | 12.58 p. m. | 20 | crs. S..... |
| | | | | 1.05 p. m. | 20 | crs. S..... |
| ..... | Burias Id., Port Busin (pt. below fort rf.). | C. S. 4454; May, 1906. | ...do.... | 3.00 p. m. | ..... | mrgn. co. Rf..... |
| ..... | Burias Id., Port Busin(anch.) | .....do..... | ...do.... | 8.00 p. m. | 12 | ..... |
| ..... | Port Busin (pt. below fort, rf.) | .....do..... | Apr. 23 | 5.30 a. m. | ..... | mrgn. co. Rf..... |
| ..... | Port Busin (beach at fort pt.) | .....do..... | ...do.... | 5.30 a. m. | ..... | S., R., Co..... |
| | *Between Marinduque and Luzon.* | | | | | |
| D. 5219 | Mompog Id. (NE.), N. 35° 30′ W., 12.25 miles (13° 21′ N., 122° 18′ 45″ E.). | C. S. 4715; Apr., 1907. | Apr. 23 | 1.57 p. m. | 530 | gn. M..... |
| | | | | 2.37 p. m. | 530 | gn. M..... |
| ..... | Santa Cruz Harbor Marinduque (anch.). | C. S. 4453; July, 1908. | ...do.... | 8.00 p. m. | 12 | S..... |
| ..... | Santa Cruz Id. (SE.)..... | .....do..... | Apr. 24 | 6.00 a. m. | ..... | mrgn. Co..... |
| ..... | Santa Cruz Id. (SE.)..... | .....do..... | ...do.... | 8.30 a. m. | ..... | S., grassy..... |
| D. 5220 | San Andreas Id. (W.), S. 57° W., 8.50 miles (13° 38′ N., 121° 58′ E.). | C. S. 4714; June, 1906. | ...do.... | 12.57 p. m. | 50 | sft. gn. M..... |
| | | | | 1.06 p. m. | 50 | sft. gn. M..... |
| D. 5221 | San Andreas Id. (W.), S. 27° E., 5.50 miles (13° 38′ 15″ N., 121° 48′ 15″ E.). | .....do..... | ...do.... | 3.05 p. m. | 193 | gn. M..... |
| | | | | 3.25 p. m. | 193 | gn. M..... |
| D. 5222 | San Andreas Id. (W.), S. 57° E., 9.20 miles (13° 38′ 30″ N., 121° 42′ 45″ E.). | .....do..... | ...do.... | 4.33 p. m. | 195 | gn. M..... |
| | | | | 4.49 p. m. | 195 | gn. M..... |
| D. 5223 | Malabrigo Lt., W., 9.80 miles (13° 36′ N., 121° 25′ 30″ E.). | .....do..... | ...do.... | 7.47 p. m. | ..... | ..... |
| D. 5224 | Malabrigo Lt., N. 79° W., 6.25 miles (13° 34′ 50″ N., 121° 21′ 45″ E.). | .....do..... | ...do.... | 8.24 p. m. | ..... | ..... |
| | *China Sea, south of Corregidor.* | | | | | |
| D. 5225 | Corregidor Lt., N. 10° E., 9.50 miles (14° 13′ 24″ N., 120° 32′ 36″ E.). | C. S. 4240; Feb., 1907. | May 4 | 7.06 p. m. | ..... | ..... |
| D. 5226 | Corregidor Lt., N. 10° E., 10.70 miles (14° 12′ 15″ N., 120° 32′ 24″ E.). | .....do..... | ...do.... | 7.45 p. m. | ..... | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | 2 gill nets | | | | | Hauled following morning. |
| | | | | | 2 wire traps | botm | | | | Lost. |
| | | | | | dip; e. l | surface | 1–30 | | | |
| 81 | 82 | 51.4 | 1.02475 | 1.02485 | Luc. sdr. (a) | | | | | |
| 81 | 81 | | | | 12′ Agz.; m. b | botm | 20 | N. 36° E | 1.0 | |
| 82 | 81 | 50.5 | 1.02440 | 1.02441 | Luc. sdr. (a) | | | | | |
| 82 | 82 | | | | 12′ Agz.; m. b | botm | 20 | S. 77° E | 1.2 | |
| | | | | | 150′ seine | 15 ft | 2 30 | | | 5 hauls. |
| | | | | | dyn | 6–30 ft | 2 30 | | | |
| | | | | | dip; e. l | surface | 3 00 | | | |
| 80 | 80 | 51.9 | 1.02481 | 1.02465 | Luc. sdr. (a) | | | | | |
| 80 | 80 | | | | 12′ Agz.; m. b | botm | 20 | N. 42° W | 1.5 | |
| 83 | 82 | 63.1 | 1.02489 | 1.02496 | Luc. sdr. (a) | | | | | |
| 85 | 81 | | | | 12′ Agz.; m. b | botm | 20 | N. 45° W | 1.2 | |
| 86 | 82 | | 1.02538 | | Tnr.-Blish sdr. (e). | | | | | |
| 86 | 82 | | | | 9′ Jn. dr | botm | 5 | N. 16° W | .2 | |
| | | | | | dyn | 10–30 ft | 2 00 | | | |
| | | | | | dip; e. l | surface | 2 00 | | | |
| | | | | | dyn | 10–30 ft | 1 30 | | | |
| | | | | | 150′ seine | 6 ft | 1 30 | | | 3 hauls. |
| 84 | 86 | 50.8 | 1.02468 | 1.02467 | Luc. sdr. (a) | | | | | |
| 86 | 87 | | | | 12′ Agz.; m. b | botm | 20 | N. 27° E | 1.5 | |
| | | | | | dip; e. l | surface | 2 00 | | | |
| | | | | | dyn | 6–15 ft | 1 00 | | | |
| | | | | | 150′ seine | 4 ft | | | | 5 hauls; beach inside reef. |
| 87 | 85 | | 1.02493 | | Tnr.-Blish sdr. (e). | | | | | |
| 87 | 85 | | | | 12′ Agz.; m. b | botm | 14 | N. 54° W | .7 | |
| 85 | 84 | 52.4 | 1.02503 | 1.02467 | Luc. sdr. (a) | | | | | |
| 85 | 84 | | | | 12′ Agz.; m. b | botm | 20 | N. 21° W | 1.0 | |
| 85 | 85 | 52.8 | 1.02470 | 1.02447 | Luc. sdr. (a) | | | | | |
| 86 | 85 | | | | 12′ Agz.; m. b | botm | 20 | N. 20° W | 1.7 | |
| 83 | 84 | | | | int. 4 | surface | 20 | S. 69° W | 1.8 | |
| 83 | 84 | | | | int. 4 | surface | 10 | N. 80° W | .4 | |
| 85 | 84 | | 1.02448 | | int. 4 § | 40 fms | 20 (?) | S | .9 | Record incomplete. |
| 85 | 83 | | 1.02514 | | int. 4 | surface | 20 | S | .8 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *East of Mindoro.* | | 1908. | | *fms.* | |
| D. 5227 | Pt. Origon, S. 44° E., 18.30 miles (12° 53′ 45″ N., 121° 52′ 30″ E.). | C. S. 4714; June, 1906. | May 5 | 1.04 p. m.<br>1.30 p. m. | 322<br>322 | gn. M.<br>..... |
| | *South of Romblon.* | | | | | |
| D. 5228 | Romblon Lt., N. 3° E., 6.25 miles (12° 29′ 30″ N., 122° 15′ 45″ E.). | C. S. 4715; Apr., 1907. | May 5 | 7.02 p. m.<br>7.02 p. m. | .....<br>..... | .....<br>..... |
| | *Between Cebu and Leyte.* | | | | | |
| D. 5229 | Talong Id. (E.), S. 17° W., 5.75 miles (10° 48′ 45″ N., 124° 21′ 15″ E.). | C. S. 4719; Aug., 1904. | May 7 | 9.34 a. m.<br>9.55 a. m. | *290<br>*290 | .....<br>..... |
| | *Between Bohol and Leyte.* | | | | | |
| D. 5230 | Limasaua Id. (S.), S. 68° E., 22.50 miles (10° 01′ 50″ N., 124° 42′ 30″ E.). | C. S. 4719; Aug., 1904. | May 7 | 7.03 p. m.<br>7.13 p. m.<br>7.13 p. m. | 118<br>118<br>118 | gy. S.<br>.....<br>..... |
| D, 5231 | Limasaua Id. (S.), S. 68° E., 21.70 miles (10° 01′ 15″ N., 124° 43′ 15″ E.). | .....do..... | ...do..... | 7.48 p. m. | ..... | ..... |
| D. 5232 | Limasaua Id. (S.), S. 69° E., 20.60 miles (10° 00′ 45″ N. 124° 44′ 06″ E.). | .....do..... | ...do..... | 8.25 p. m. | ..... | ..... |
| D. 5233 | Limasaua Id. (S.), S. 70° E., 19.50 miles (10° 00′ 22″ N., 124° 45′ 06″ E.). | .....do..... | ...do..... | 9.00 p. m. | ..... | ..... |
| D. 5234 | Limasaua Id. (S.), S. 70° 30′ E., 18.50 miles (10° N., 124° 46′ 06″ E.). | .....do..... | ...do..... | 9.42 p. m. | ..... | ..... |
| | *Pacific Ocean, east coast Mindanao.* | | | | | |
| ..... | Surigao (beach near Bilan Bilan). | C. S. 4644: July, 1905. | May 8 | 8.30 a. m. | ..... | M., S., Co., grassy. |
| ..... | Surigao (rf. above Bilan Bilan). | .....do..... | ...do..... | 1.30 p. m. | ..... | R., co. Clmps..... |
| D. 5235 | Nagubat Id. (S.), S. 58° W., 7 miles (9° 43′ N., 125° 48′ 15″ E.). | C. S. 4719: Aug., 1904. | May 9 | 9.24 a. m.<br>9.30 a. m. | 44<br>44 | sft. M.<br>sft. M. |
| ..... | Generale Id. (S. W. shore, beach). | .....do..... | ...do..... | 3.00 p. m. | ..... | S., Co., grassy..... |
| ..... | Generale Id. (rf.) | .....do..... | ...do..... | 3.00 p. m. | ..... | mrgn. Co..... |
| ..... | Generale Id.(Capunuypugan Pt., rf.). | .....do..... | May 10 | 8.30 a. m. | ..... | mrgn. Co..... |
| ..... | Generale Id. (rf.) | .....do..... | ...do..... | 3.00 p. m. | ..... | ..... |
| D. 5236 | Magabao Id. (S.), N. 85° W., 9.10 miles (8° 50′ 45″ N., 126° 26′ 52″ E.). | .....do..... | May 11 | 10.27 a. m.<br>11.02 a. m. | 494<br>494 | fne. gy. S.<br>fne. gy. S. |
| ..... | Lianga Bay (rf. S. of town) | .....do..... | ...do..... | 4.00 p. m. | ..... | co. Mss., algæ .... |
| ..... | Lianga Bay (anch.) | .....do..... | ...do..... | 8.00 p. m. | 15 | ..... |
| D. 5237 | Sanco Pt. Id. (N.), N. 69° W., 5.75 miles (8° 09′ 06″ N., 126° 31′ 45″ E.). | C. S. 4724; Oct., 1909. | May 12 | 10.11 a. m.<br>10.42 a. m. | 249<br>249 | ..... (?) .....<br>gn. M. |
| D. 5238 | Pt. Lambajon, S. 65° W., 4.30 miles (7° 34′ 45″ N., 126° 38′ 15″ E.). | .....do..... | ...do..... | 3.00 p. m.<br>3.28 p. m. | 380<br>380 | gn. M.<br>gn. M. |
| ..... | Baganga Bay (rf. inside Pt. Lacud). | .....do..... | May 13 | 8.30 a. m. | ..... | mrgn. Co..... |
| ..... | Baganga Bay (S. W. shore, beach). | .....do..... | ...do..... | 8.30 a. m. | ..... | S..... |
| ..... | Baganga Bay (W. shore, beach). | .....do..... | ...do..... | 1.00 p. m. | ..... | S., G..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 86 | 86 | ..... | 1.02498 | ..... | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 85 | 87 | ..... | ..... | ..... | int. 4 § ..... | 290 fms. | 20<br>18 | S. 30° E... | 0.6 | 400 fms. dredge cable out. |
| 84 | 85 | ..... | 1.02519 | ..... | int. 4..... | surface. | 20 | S. 30° E... | .6 | |
| 84 | 85 | ..... | ..... | ..... | K2, K5 ‡..... | surface. | 20 | S. 30° E... | .6 | |
| 86 | 85 | ..... | 1.02525 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 86 | 85 | ..... | ..... | ..... | int. 4; K2, K5 § ..... | | 20<br>11 | S. 17° W.. | .5 | 225 fms. dredge cable out. |
| 84 | 84 | 57.6 | 1.02477 | 1.02496 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | int. 4..... | surface. | 20 | S. 63° E... | .6 | |
| 84 | 84 | ..... | ..... | ..... | K2, K5 ‡..... | surface. | 20 | S. 63° E... | .6 | |
| 85 | 84 | ..... | 1.02531 | ..... | int. 4; K2, K5 § | 80 fms.. | 20<br>7 | S. 63° E... | .4 | 125 fms. dredge cable out. |
| 83.5 | 84 | ..... | 1.02531 | ..... | int. 4..... | surface. | 20 | S. 63° E... | .6 | |
| 83 | 84 | ..... | 1.02514 | ..... | int. 4; K2, K5 § | 100 fms. | 20<br>9 | S. 63° E... | .8 | 150 fms. dredge cable out. |
| 83 | 84 | ..... | 1.02531 | ..... | int. 4; K2, K5 § | 15 fms.. | 20<br>2 | S. 63° E... | .4 | 25 fms. dredge cable out. |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 6–30 ft.. | 3 00 | ..... | ..... | 5 hauls. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–15 ft.. | 4 00 | ..... | ..... | |
| 84 | 86 | ..... | 1.02475 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 86 | ..... | ..... | ..... | 12′ Agz.; 3 m. b. | botm... | 20 | S. 56° E... | .6 | 1 bridle stop carried away. |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 6–8 ft... | 2 00 | ..... | ..... | 5 hauls. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 12–20 ft. | 2 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 12–20 ft. | 3 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 4–15 ft.. | 2 00 | ..... | ..... | |
| 87 | 85 | 41.2 | 1.02453 | 1.02522 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 86 | 86 | ..... | ..... | ..... | 12′ Agz.; 3 m. b. | botm... | 20 | S. 4° E.... | 2.5 | Bridle stops carried away; net capsized; catch saved. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 12ft.... | 30 | ..... | ..... | Seining party failed to find suitable beach. |
| ..... | ..... | ..... | ..... | ..... | dip; e. l..... | surface. | 30 | ..... | ..... | |
| 85 | 85 | 46.4 | 1.02477 | 1.02482 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 85 | 85 | ..... | ..... | ..... | 12′ Agz.; 3 m. b. | botm... | 17 | S. 3° E.... | 2.1 | Veered at intervals from 450 to 550 fms. |
| 91 | 86 | 43.0 | 1.02453 | 1.02459 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 85 | 86 | ..... | ..... | ..... | 12′ Agz.; 3 m. b. | botm... | 20 | S. 15° W.. | 2.5 | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 4–20 ft.. | 2 00 | ..... | ..... | Roily, brackish water. |
| ..... | ..... | ..... | ..... | ..... | 130′ seine..... | 10–20 ft. | ..... | ..... | ..... | 7 hauls. |
| ..... | ..... | ..... | ..... | ..... | 250′ seine..... | 30 ft.... | ..... | ..... | ..... | 3 hauls. River explored. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Pujada Bay and vicinity.* | | 1908. | | *fms.* | |
| D. 5239 | Uanivan Id. (N.), N. 78° E., 2.25 miles (6° 49′ 08″ N., 126° 15′ 12″ E.). | C. S. 4646; Jan.,1905. | May 14 | 12.44 p. m. | 171 | sft. gy. M. |
| | | | | 1.02 p. m. | 171 | sft. gy. M. |
| D. 5240 | Uanivan Id. (N.), E., 2.40 miles (6° 49′ 36″ N. ,126° 15′ E.). | do. | do. | 1.33 p. m. | 145 | sft. gy. M. |
| | | | | 1.49 p. m. | 145 | sft. gy. M. |
| D. 5241 | Uanivan Id. (N.), S. 68° E., 3 miles (6° 50′ 45″ N., 126° 14′ 38″ E.). | do. | do. | 2.24 p. m. | 215 | sft. gy. M. |
| | | | | 3.05 p. m. | 215 | sft. gy. M. |
| D. 5242 | Uanivan Id. (N.), S. 56° E., 4 miles (6° 51′ 53″ N., 126° 14′ 10″ E.). | do. | do. | 3.46 p. m. | 191 | sft. gy. M. |
| | | | | 4.03 p. m. | 191 | sft. gy. M. |
| ..... | Pujada Bay (rf. S. of Tataidaga Pt.). | do. | May 15 | 9.00 a. m. | ..... | S., co. Clmps. |
| ..... | Pujada Bay (beach both sides Mati.). | do. | do. | 9.00 a. m. | ..... | Co., R., S. |
| D. 5243 | Uanivan Id. (N.), S. 66° E., 3.10 miles (6° 50′ 55″ N., 126° 14′ 35″ E.). | do. | do. | 12.54 p. m. | 218 | gy. M. |
| | | | | 1.12 p. m. | 218 | gy. M. |
| D. 5244 | Uanivan Id. (N.), S. 52° 30′ E., 4 miles (6° 52′ 05″ N., 126° 14′ 15″ E.). | do. | do. | 1.48 p. m. | 171 | gy. M. |
| | | | | 2.05 p. m. | 171 | gy. M. |
| D. 5245 | Uanivan Id. (N.), S. 41° E., 4 miles (6° 52′ 36″ N., 126° 14′ 52″ E.). | do. | do. | 2.47 p. m. | 135 | gy. M. |
| | | | | 3.02 p. m. | 135 | gy. M. |
| | *Pacific Ocean, east of Mindanao.* | | | | | |
| D. 5246 | Luban Id. (N.), S. 58° W., 4.6 miles (6° 29′ 15″ N., 126° 18′ 45″ E.). | C. S. 4724; Oct.,1909. | May 15 | 7.10 p. m. | ..... | ..... |
| | *Gulf of Davao.* | | | | | |
| ..... | Beach east of Davao town. | C. S. 4724; Oct.,1909. | May 16 | 9.00 a. m. | ..... | M., S. |
| D. 5247 | Dumalag Id. (S.), S. 78° W., 3.8 miles (7° 02′ N., 125° 38′ 45″ E.). | do. | May 18 | 8.47 a. m. | 135 | M. |
| | | | | 9.08 a. m. | 135 | M. |
| D. 5248 | Lanang Pt., S. 33° W., 0.40 mile (7° 07′ 25″ N., 125° 40′ 24″ E.). | C. S. 4648; Sept.,1907. | do. | 10.30 a. m. | 18 | Co. |
| | | | | 10.38 a. m. | 18 | Co. |
| D. 5249 | Lanang Pt., N. 1 mile (7° 06′ 06″ N., 125° 40′ 08″ E.). | do. | do. | 10.57 a. m. | 23 | Co., S. |
| | | | | 11.02 a. m. | 23 | Co., S. |
| D. 5250 | Linao Pt., N. 22° E., 1.1 miles (7° 05′ 07″ N., 125° 39′ 45″ E.). | do. | do. | 11.20 a. m. | 23 | Co., S. |
| | | | | 11.24 a. m. | 23 | Co., S. |
| D. 5251 | Linao Pt., N. 32° E., 1.1 miles (7° 05′ 12″ N., 125° 39′ 35″ E.). | do. | do. | 1.07 p. m. | 20 | Co. |
| | | | | 1.10 p. m. | 20 | Co. |
| D. 5252 | Linao Pt., N. 22° E., 1.5 miles (7° 04′ 48″ N., 125° 39′ 38″ E.). | do. | do. | 1.22 p. m. | 28 | Co. |
| | | | | 1.25 p. m. | 28 | Co. |
| D. 5253 | Linao Pt., N. 22° E., 1.5 miles (7° 04′ 48″ N., 125° 39′ 38″ E.). | do. | do. | 1.34 p. m. | 28 | Co. |
| | | | | 1.47 p. m. | 28 | Co. |
| D. 5254 | Linao Pt., N. 44° E., 0.7 mile (7° 05′ 42″ N., 125° 39′ 42″ E.). | do. | do. | 2.22 p. m. | 21 | S., Co. |
| | | | | 2.26 p. m. | 21 | S., Co. |
| D. 5255 | Dumalag Id. (S.), S. 65° W., 4.5 miles (7° 03′ N., 125° 39′ E.). | do. | do. | 6.03 p. m. | 100 | sft. M. |
| | | | | 6.13 p. m. | 100 | sft. M. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 84 | 86 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 86 | ..... | ..... | ..... | 12′ Agz.; 3 m.b. | botm... | 7 | N. 13° W.. | 0.5 | Bridle and tripping stops carried away; net torn; frame twisted; 1 mud bag lost. |
| 84 | 86 | ..... | 1.02448 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 86 | ..... | ..... | ..... | Int. 4§..... | 115 fms. | 20 7 | N. 16° W.. | 1.1 | 175 fms. dredge cable out. |
| 85 | 85 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 85 | ..... | ..... | ..... | 9′ alb. Blk.; m. b. | botm... | 20 | N. 15° W.. | 1.1 | Veered from 506 to 540 fms. |
| 84 | 85 | 64.1 | 1.02457 | 1.02489 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 83.5 | 85 | ..... | ..... | ..... | 9′ alb. Blk.; m. b. | botm... | 20 | N. 13° W.. | 1.0 | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–20 ft.. | 2 30 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 10 ft.... | 2 00 | ..... | ..... | 5 hauls. |
| 84 | 84 | 63.6 | 1.02453 | 1.02468 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 85 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 15° W.. | 1.1 | |
| 84 | 85 | ..... | 1.02497 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 46° E... | .7 | |
| 84 | 84 | ..... | 1.02468 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 2° W... | .8 | Net damaged. |
| 83 | 82 | ..... | 1.02477 | ..... | Int. 4§..... | 100 fms. | 20 8 | S. 6° E.... | 1.8 | 150 fms. dredge cable out. |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 6 ft..... | 2 00 | ..... | ..... | 3 hauls. |
| 80 | 83 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 76° W.. | .5 | |
| 84.5 | 83 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84.5 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 4 | (?)..... | (?) | Veered from 27 to 30 fms. |
| 85 | 84 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 84 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 7 | (?)..... | (?) | Veered from 30 to 36 fms. |
| 84 | 84 | ..... | 1.02457 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 3 | (?)..... | (?) | |
| 86 | 83 | ..... | 1.02433 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 86 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 5 | (?)..... | (?) | |
| 85 | 83 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 4 | S. 29° E... | .2 | |
| 83 | 84 | ..... | 1.02433 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 11 | N. 11° E.. | 1.0 | |
| 83 | 83 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 5 | N..... | .3 | |
| 83 | 84 | ..... | 1.02227 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | (?)..... | (?) | Made after dark. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Southern Mindanao, eastern Illana Bay.* | | 1908. | | *fms.* | |
| ..... | Cotabato (beach outside Panalisan Pt.).[a] | C. S. 4723; Oct.,1905. | May 20 | 2.30 p. m. | ..... | S., M. |
| ..... | Cotabato (near anch. outside Panalisan Pt.). | .....do..... | ...do..... | 7.00 p. m. | 30 | S. |
| ..... | Malabang (beach below river).[b] | .....do..... | May 21 | 8.30 a. m. | ..... | S. |
| ..... | Malabang (river) | .....do..... | ...do..... | 3.00 p. m. | ..... | S. |
| ..... | Malabang (anch.) | .....do..... | ...do..... | 8.00 p. m. | 13 | ..... |
| D. 5256 | Utara Pt., Bongo Id., N. 76° W., 2.80 miles (7° 21′ 45″ N., 124° 07′ 15″ E.) | C. S. 4619; Apr.,1907. | May 22 | 9.39 a. m. | 158 | M. |
| | | | | 9.54 a. m. | 158 | M. |
| D. 5257 | Utara Pt., Bongo Id., N. 88° W., 7.70 miles (7° 22′ 12″ N., 124° 12′ 15″ E.). | .....do..... | ...do..... | 10.07 a. m. | 28 | M. |
| | | | | 10.11 a. m. | 28 | M. |
| ..... | Polloc (Marigabato Pt., rf.) | .....do..... | ...do..... | 1.00 p. m. | ..... | S., sctrd. Co. |
| ..... | Parang (Lalayanga Pt., rf.) | .....do..... | May 23 | 8.30 a. m. | ..... | sctrd. Co., co. R. |
| ..... | Parang (beach in front of village). | C. S. 4723; Oct.,1905. | ...do..... | 8.30 a. m. | ..... | S. |
| | *Vicinity of Zamboanga.* | | | | | |
| ..... | Zamboanga (W. end Little Sta. Cruz Id., rf.). | C. S. 4723; Oct.,1905. | May 26 | 10.10 a. m. | ..... | sft. Co., co. heads |
| ..... | Zamboanga (Little Sta. Cruz Id., rf.). | .....do..... | May 28 | 7.00 a. m. | ..... | sft. Co., mrgn. Rfs. |
| | *Iloilo.* | | | | | |
| ..... | E. of mouth of Iloilo River (beach). | ..... | June 2 | 9.00 a. m. | ..... | S. |
| | *Off southern Panay.* | | | | | |
| D. 5258 | Juraojurao Id. (S.), S. 75° W., 16.25 miles (10° 27′ 45″ N., 122° 12′ 30″ E.). | C. S. 4717; Feb.,1903. | June 2 | 7.08 p. m. | ..... | ..... |
| | *Off northwestern Panay.* | | | | | |
| D. 5259 | Caluya Id. (S.), S. 73° W., 12 miles (11° 57′ 30″ N., 121° 42′ 15″ E.). | C. S. 4714; June,1906. | June 3 | 10.06 a. m. | 312 | gy. M., Glob. |
| | | | | 10.31 a. m. | 312 | gy. M., Glob. |
| | *Off southeastern Mindoro.* | | | | | |
| D. 5260 | Balanja Pt., N. 28° W., 7.20 miles (12° 25′ 35″ N., 121° 31′ 35″ E.). | C. S. 4311; July,1904. | June 3 | 3.14 p. m. | 234 | gn. M., S. |
| | | | | 3.32 p. m. | 234 | gn. M., S. |
| ..... | Mansalay (anch.) | .....do..... | ...do..... | 9.00 p. m. | 9 | ..... |
| ..... | Balanja Pt. (rf.) | .....do..... | June 4 | 7.30 a. m. | ..... | mrgn. Co. |
| ..... | Mansalay Bay (W. shore, beach). | .....do..... | ...do..... | 7.30 a. m. | ..... | S., Co. |
| ..... | Mansalay Bay (NE. shore, rf.). | .....do..... | ...do..... | 1.00 p. m. | ..... | sctrd. Co. |
| H. 4912 | Balanja Pt., N. 73° W., 3.70 miles (12° 30′ 55″ N., 121° 31′ 50″ E.). | .....do..... | ...do..... | 5.34 p. m. | 56 | bl. M., S. |
| D. 5261 | Balanja Pt., N. 80° W., 6 miles (12° 30′ 55″ N., 121° 34′ 24″ E.). | .....do..... | ...do..... | 6.00 p. m. | 145 | S., M. |
| | | | | 6.11 p. m. | 145 | S., M. |
| | *Off eastern Mindoro.* | | | | | |
| D. 5262 | Pt. Origon, N. 83° E., 28.50 miles (12° 37′ 30″ N., 121° 37′ 30″ E.). | C. S. 4714; June, 1906. | June 4 | 7.39 p. m. | ..... | ..... |
| | | | | 7.45 p. m. | ..... | ..... |

[a] On May 20 collecting party went up Mindanao River to Cotabato; visited market.
[b] May 22 to 24 shore party made collections at Lake Lanao; visited market at Vicar.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | 130′ seine | 6 ft | 3 00 | | | 7 hauls. |
| | | | | | 2 gill nets | | | | | Set over night. |
| | | | | | 150′ seine | 20 ft | 3 00 | | | 5 hauls. |
| | | | | | 130′ seine | 5 ft | | | | 3 hauls. |
| | | | | | dip; e. l | surf | 1 30 | | | |
| 83 | 86 | | 1.02262 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 86 | | | | 12′ Agz.; m. b. | botm | 20 | N. 49° E | 0.6 | |
| 83 | 86 | | 1.02277 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 86 | | | | 12′ Agz.; m. b. | botm | 20 | S. 66° E | .6 | |
| | | | | | dyn | 4–25 ft | 3 00 | | | |
| | | | | | dyn | 6–25 ft | 3 00 | | | |
| | | | | | 150′ seine | 20 ft | 3 00 | | | 8 hauls. |
| | | | | | dyn | 12 ft | 1 30 | | | |
| | | | | | dyn | 5–30 ft | 4 00 | | | |
| | | | | | 150′ seine | 5 ft | 2 00 | | | 5 hauls. |
| 84 | 84 | | 1.02587 | | int. 5 | surface. | 20 | S. 67° 30′ W. | .3 | |
| 84.5 | 85 | 49.3 | 1.02489 | 1.02484 | Luc. sdr. (a) | | | | | |
| 84 | 85 | | | | 12′ Agz.; m. b. | botm | 20 | N. 6° W | 1.0 | |
| 85 | 85 | 51.4 | 1.02484 | 1.02484 | Luc. sdr. (a) | | | | | |
| 85 | 83 | | | | 12′ Agz.; m. b. | botm | 20 | N. 14° W | 2.2 | |
| | | | | | dip; e. l | surf | 1 00 | | | |
| | | | | | dyn | 8–15 ft | 4 00 | | | |
| | | | | | 150′ seine | 5–10 ft | 3 00 | | | 5 hauls; many stinging medusæ. |
| | | | | | dyn | 5–15 ft | 2 00 | | | |
| | | | 1.02463 | | Tnr.-Blish sdr. (e). | | | | | |
| 85 | 84 | | 1.02448 | | Tnr.-Blish sdr. (e). | | | | | |
| 85 | 83 | | | | 12′ Agz.; m. b. | botm | 20 | N. 29° E | .4 | |
| 85 | 83 | | 1.02448 | | int. 5 | surface. | 20 | N | .5 | |
| 85 | 83 | | | | K2, K5‡ | surface. | 15 | N | .4 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Off eastern Mindoro*—Cont'd. | | 1908. | | *fms.* | |
| D. 5263 | Pt. Origon, N. 85° E., 28.3 miles (12° 38′ 30″ N., 121° 37′ 30″ E.). | C. S. 4714; June, 1906. | June 4 | 8.17 p. m. | ..... | ..... |
| ..... | Naujan River (anch.) [a] | ....do.... | June 5 | 8.00 p. m. | 17 | S..... |
| | *Verde Id. Passage and Batangas Bay.* [b] | | | | | |
| D. 5264 | Malabrigo Lt., N. 86° 30′ E., 7.30 miles (13° 35′ 30″ N., 121° 08′ E.). | C. S. 4240; Feb., 1907. | June 6 | 8.19 a. m. | 181 | S., P..... |
| | | | | 8.38 a. m. | 181 | S., P..... |
| D. 5265 | Matocot Pt., Luzon, S. 17° E., 3.30 miles (13° 41′ 15″ N., 120° 00′ 50″ E.). | ....do.... | ...do... | 10.49 a. m. | 135 | S., M..... |
| | | | | 11.09 a. m. | 135 | S., M..... |
| D. 5266 | Matocot Pt., S. 22° E., 7 miles (13° 44′ 36″ N., 120° 59′ 15″ E.). | C. S., 4240; Feb., 1907. | June 8 | 9.08 a. m. | 100 | M..... |
| | | | | 9.18 a. m. | 100 | M..... |
| D. 5267 | Matocot Pt., S., 39° E., 5.50 miles (13° 42′ 20″ N., 120° 58′ 25″ E.). | ....do.... | ...do... | 10.08 a. m. | 170 | P., S., Sh..... |
| | | | | 10.25 a. m. | 170 | P., S., Sh..... |
| D. 5268 | Matocot Pt., S., 50° E., 5.80 miles (13° 42′ N., 120° 57′ 15″ E.). | ....do.... | ...do... | 10.59 a. m. | 170 | S., P..... |
| | | | | 11.14 a. m. | 170 | S., P..... |
| D. 5269 | Matocot Pt., S., 54° E., 3 miles (13° 39′ 50″ N., 120° 59′ 30″ E.). | ....do.... | ...do... | 1.08 p. m. | 220 | fne. S., P..... |
| | | | | 1.34 p. m. | 220 | fne. S., P..... |
| D. 5270 | Escarceo Lt., S. 9° E., 4.25 miles (13° 35′ 45″ N., 120° 58′ 30″ E) | ....do.... | ...do... | 3.07 p. m. | 235 | gy. S., blk. Sp..... |
| | | | | 3.27 p. m. | 235 | ..... |
| ..... | Port Galera (anch.) | ....do.... | ...do... | 8.30 p. m. | 13 | ..... |
| ..... | Port Galera (Paniquian Id., beach). | ....do.... | June 9 | 8 30 a. m. | ..... | S., Co..... |
| ..... | Port Galera (Medio Id., rf.) | ....do.... | ...do... | 8.30 a. m. | ..... | mrgn. Clmps. Co.. |
| | *Manila Bay.* | | | | | |
| ..... | Cavite (anch.) | C. S. 4240; Feb., 1907. | June 9 | 8.00 p. m. | 4 | ..... |
| ..... | Bacoor (beach) | ....do.... | June 15 | 10.00 a. m. | ..... | S..... |
| | *China Sea, vicinity southern Luzon.* | | | | | |
| ..... | Jamelo Cove (rf.) | C. S. 4240; Feb., 1907. | July 13 | 8.00 a. m. | ..... | Co. unthrifty and sparse. |
| ..... | Jamelo Cove (beach) | ....do.... | ...do... | 8.00 a. m. | ..... | S..... |
| ..... | Jamelo Cove (E. side), (rf.) | ....do.... | ...do... | 2.00 p. m. | ..... | Co. unthrifty and sparse. |
| ..... | Jamelo Cove (beach) | ....do.... | ...do... | 2.00 p. m. | ..... | S..... |
| D. 5271 | Corregidor Lt., N. 17° E., 20.70 miles (14° 03′ N., 120° 27′ 45″ E.). | ....do.... | July 14 | 8.08 a. m. | 56 | S..... |
| | | | | 8.30 a. m. | 56 | S..... |
| D. 5272 | Corregidor Lt., N. 26° E., 25.50 miles (14° N., 120° 22′ 30″ E.). | ....do.... | ...do... | 9.32 a. m. | 118 | M., Sh., co. S..... |
| | | | | 10.05 a. m. | 118 | M., Sh., co. S..... |
| D. 5273 | Corregidor Lt., N. 27° E., 27.25 miles (13° 58′ 45″ N., 120° 21′ 35″ E.). | ....do.... | ...do... | 10.34 a. m. | 114 | M., Sh., co. S..... |
| | | | | 10.47 a. m. | 114 | M., Sh., co. S..... |
| ..... | Tilig Bay (beach inside village). | ....do.... | ...do... | 2.30 p. m. | ..... | S., M..... |

[a] On June 5 a shore party went about 4 miles up the Naujan River in boats.
[b] On June 7 a collecting trip was made up the Batangas River for about 2 miles; several hauls with a 15-foot seine.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 4 | 83 | ..... | ..... | ..... | int. 5; K2, K5 §. | 65 fms.. | 20 5 | N..... | 0.5 | |
| .... | ..... | ..... | ..... | ..... | dip.; e. l..... | surface. | 1 30 | ..... | ..... | |
| 84 | 84 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 4 | S. 37° E... | .5 | Cable parted while heaving in; trawl lost with 20 fms. cable. |
| 87 | 85 | ..... | 1.02489 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 89 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 46° W.. | 1.0 | |
| 83 | 84 | ..... | 1.02448 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 86° W.. | 1.1 | |
| 85 | 85 | ..... | 1.02448 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 65° W... | 1.3 | |
| 83 | 85 | ..... | 1.02433 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 3° W... | 1.0 | |
| 84 | 85 | ..... | 1.02417 | 1.02509 | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | Therm. failed to register. |
| 85 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 18° E... | 1.5 | |
| 85 | 84 | ..... | 1.02448 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | Water bottle failed to work. |
| 80.5 | 83 | ..... | ..... | ..... | int. 5; K2, K5 §. | 140 fms . | 20 8 | N. 1° W... | 1.1 | 200 fms. dredge cable out. |
| .... | ..... | ..... | ..... | ..... | dip; e. l..... | surface. | 45 | ..... | ..... | |
| .... | ..... | ..... | ..... | ..... | 150′ seine..... | 7 ft .... | 2 00 | ..... | ..... | 5 hauls. |
| .... | ..... | ..... | ..... | ..... | dyn..... | 8–20 ft.. | 4 00 | ..... | ..... | |
| .... | ..... | ..... | ..... | ..... | dip; e. l..... | surface. | 1 00 | ..... | ..... | |
| .... | ..... | ..... | ..... | ..... | 45′ seine..... | 4 ft .... | ..... | ..... | ..... | 8 hauls. |
| .... | ..... | ..... | ..... | ..... | dyn..... | 8–15 ft.. | 3 00 | ..... | ..... | 4 shots. |
| .... | ..... | ..... | ..... | ..... | 150′ seine..... | 10 ft .... | 3 00 | ..... | ..... | 7 hauls. |
| .... | ..... | ..... | ..... | ..... | dyn..... | 8–15 ft.. | 3 00 | ..... | ..... | |
| .... | ..... | ..... | ..... | ..... | 150′ seine..... | 6 ft .... | 4 00 | ..... | ..... | 3 hauls. |
| 83 | 85 | ..... | 1.02552 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | First attempt at sounding resulted in loss of all apparatus used. |
| 83 | 85 | ..... | ..... | ..... | 12′ Agz..... | botm... | 20 | S..... | .7 | |
| 83 | 84 | 57.4 | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz..... | botm... | 26 | S. 37° E... | .3 | |
| 83 | 84 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz..... | botm... | 30 | N. 8° E.... | 1.7 | |
| .... | .... | ..... | ..... | ..... | 130′ seine..... | 8 ft .... | 2 30 | ..... | ..... | 4 hauls. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *China Sea, vicinity southern Luzon*—Continued. | | 1908. | | *fms.* | |
| ..... | Tilig Bay (rf. outside village). | C. S. 4240; Feb., 1907. | July 14 | 3.00 p. m. | ..... | mrgn. rf..... |
| ..... | Tilig Bay (anch.)..... | .....do..... | ...do.... | 8.30 p. m. | ..... | ..... |
| ..... | Tilig Bay (rf.)..... | .....do..... | July 15 | 9.00 p. m. | ..... | dense co. growth.. |
| ..... | ....do..... | .....do..... | ...do.... | 1.15 p. m. | ..... | mrgn. Co..... |
| D. 5274 | Malavatuan Id. (N.), S. 73° 30′ E., 17.50 miles (13° 57′ 30″ N., 120° 03′ 25″ E.). | .....do..... | July 16 | 9.18 a. m. | 525 | gy. M., S..... |
| | | | | 9.59 a. m. | 525 | gy. M., S..... |
| D. 5275 | Malavatuan Id. (N.), S. 71° E., 10.75 miles (13° 55′ 55″ N., 120° 10′ 15″ E.). | .....do..... | ...do.... | 12.51 p. m. | 117 | fne. S..... |
| | | | | 1.05 p. m. | 117 | fne. S..... |
| H. 4913 | Malavatuan Id. (N.), S. 67° E., 9.30 miles (13° 56′ N., 120° 11′ 40″ E.). | .....do..... | ...do.... | 1.28 p. m. | 117 | S., Sh., P..... |
| ..... | Balikias Bay (rf.)..... | .....do..... | July 17 | 5.30 a. m. | ..... | mrgn. Rf..... |
| D. 5276 | Malavatuan Id. (NW.), N. 61° 30′ E., 6.50 miles (13° 49′ 15″ N., 120° 14′ 45″ E.). | .....do..... | ...do.... | 8.44 a. m. | 18 | Sh., P., S..... |
| | | | | 8.51 a. m. | 18 | Sh., P., S..... |
| D. 5277 | Malavatuan Id. (N.), S. 56° E., 8 miles (13° 56′ 55″ N., 120° 13′ 45″ E.). | .....do..... | ...do.... | 10.02 a. m. | 80 | fne. S..... |
| | | | | 10.19 a. m. | 80 | fne. S..... |
| D. 5278 | Malavatuan Id. (N.), S. 23° E., 8.50 miles (14° 00′ 10″ N., 120° 17′ 15″ E.). | .....do..... | ...do.... | 11.34 a. m. | 102 | fne. S., M., Sh..... |
| | | | | 11.53 a. m. | 102 | fne. S., M., Sh..... |
| D. 5279 | Malavatuan Id. (W.), S. 18° W., 5.40 miles (13° 57′ 30″ N., 120° 22′ 15″ E.). | .....do..... | ...do.... | 1.13 p. m. | 117 | gn. M..... |
| | | | | 1.26 p. m. | 117 | gn. M..... |
| D. 5280 | Malavatuan Id. (N.), S. 60° W., 6.10 miles (13° 55′ 20″ N., 120° 25′ 55″ E.). | .....do..... | ...do.... | 2.42 p. m. | 193 | gy. S..... |
| | | | | 3.05 p. m. | 193 | gy. S..... |
| D. 5281 | Malavatuan Id. (N.), S. 84° W., 4.30 miles (13° 52′ 45″ N., 120° 25′ E.). | .....do..... | July 18 | 10.17 a. m. | 201 | dk. gy. S..... |
| | | | | 10.40 a. m. | 201 | dk. gy. S..... |
| D. 5282 | Malavatuan Id. (N.), S. 84° W., 6.20 miles (13° 53′ N., 120° 26′ 45″ E.). | .....do..... | ...do.... | 11.21 a. m. | 248 | dk. gy. S..... |
| | | | | 11.44 a. m. | 248 | dk. gy. S..... |
| D. 5283 | Malavatuan Id. (N.), N. 64° W., 8.75 miles (13° 48′ 30″ N., 120° 28′ 40″ E.). | .....do..... | ...do.... | 1.06 p. m. | 280 | dk. gy. S..... |
| | | | | 1.36 p. m. | 280 | dk. gy. S..... |
| ..... | Looc Bay (anch.)..... | .....do..... | ...do.... | 8.45 p. m. | ..... | ..... |
| D. 5284 | Malavatuan Id. (S.), N. 46° W., 14.25 miles (13° 42′ 05″ N., 120° 30′ 45″ E.). | .....do..... | July 20 | 8.07 a. m. | 422 | gy. M., Glob..... |
| | | | | 8.45 a. m. | 422 | gy. M., Glob..... |
| D. 5285 | Malavatuan Id. (S.), N. 45° W., 17.50 miles (13° 39′ 36″ N., 120° 32′ 55″ E.). | .....do..... | ...do.... | 10.05 a. m. | 272 | sft. M..... |
| | | | | 10.33 a. m. | 272 | sft. M..... |
| H. 4914 | Malavatuan Id. (S.), N. 42° W., 18.70 miles (13° 38′ 05″ N., 120° 33′ E.). | .....do..... | ...do.... | 11.35 a. m. | 464 | gy. M., S..... |
| D. 5286 | Malavatuan Id. (S.), N. 45° W., 19.50 miles (13° 38′ 15″ N., 120° 34′ 20″ E.). | .....do..... | ...do.... | 12.31 p. m. | 450 | gy. S., M..... |
| | | | | 1.09 p. m. | 450 | gy. S., M..... |
| D. 5287 | Sombrero Id., N. 68° E., 11.25 miles (13° 37′ 40″ N., 120° 39′ E.). | .....do..... | ...do.... | 2.30 p. m. | 379 | gy. S..... |
| | | | | 2.58 p. m. | 379 | gy. S..... |
| ..... | Port Maricaban (anch.)..... | .....do..... | ...do.... | 8.15 p. m. | ..... | ..... |
| ..... | ....do..... | .....do..... | ...do.... | 9.00 p. m. | ..... | ..... |
| ..... | Port Maricaban (rf.)..... | .....do..... | July 21 | 6.00 a. m. | ..... | staghorn Clmps., S. |
| D. 5288 | Matocot Pt., Luzon, S. 20° E., 5.70 miles (13° 43′ 30″ N., 121° E.). | .....do..... | July 22 | 8.14 a. m. | *140 | S., M.*..... |
| D. 5289 | Matocot Pt., S. 42° E., 5 miles (13° 41′ 50″ N., 120° 58′ 30″ E.). | .....do..... | ...do.... | 9.03 a. m. | 172 | brk. Sh., S..... |
| | | | | 9.25 a. m. | 172 | brk. Sh., S..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn | 15 ft | 3 00 | | | 6 shots. |
| | | | | | dip; e. l | surface. | 1 00 | | | |
| | | | | | dyn | 12–20 ft. | 2 00 | | | 2 shots. |
| | | | | | dyn | 15 ft | 4 15 | | | 10 shots. |
| 82 | 83 | 41.3 | 1.02497 | 1.02577 | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz | botm | 30 | N. 63° E. | 1.7 | |
| 82 | 83 | | 1.02453 | | Tnr.-Blish sdr. (e). | | | | | |
| 82 | 84 | | | | 12′ Agz | botm | 20 | N. 84° E. | 1.5 | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | Terminal sounding of D. 5275. |
| | | | | | dyn | 6–12 ft. | 2 00 | | | 7 shots. |
| 80 | 82 | | | | Tnr.-Blish sdr. (e). | | | | | |
| 80 | 82 | | | | 12′ Agz.; m. b | botm | 15 | N. 22° W. | .7 | Net badly torn. |
| 82.5 | 83 | 58.6 | 1.02442 | | Tnr.-Blish sdr. (e). | | | | | |
| 81 | 83 | | | | 12′ Agz.; m. b. | botm | 20 | S. 70° E. | 1.2 | |
| 82 | 82 | 59.6 | 1.02457 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 82 | | | | 12′ Agz.; m. b. | botm | 4 | S. 80° E. | .6 | Belly of net carried away by weight of mud when hoisted from water. |
| 83 | 84 | | 1.02452 | | Tnr.-Blish sdr. (e). | | | | | |
| 83 | 83 | | | | 12′ Agz.; m. b. | botm | 9 | N. 60° E. | .8 | Net torn; 1 bridle stop carried away |
| 81 | 83 | 49.6 | 1.02422 | 1.02517 | Luc. sdr. (a) | | | | | |
| 81 | 83 | | | | 12′ Agz.; m. b. | botm | 18 | N. 38° E. | .6 | |
| 81.5 | 84 | 50.4 | 1.02402 | 1.02538 | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz.; m. b. | botm | 20 | N. 86° E. | 1.3 | |
| 82 | 83 | 47.4 | 1.02437 | 1.02517 | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz.; m. b. | botm | 20 | N. 85° E. | .7 | |
| 79 | 83 | 46.8 | 1.02417 | 1.02517 | Luc. sdr. (a) | | | | | |
| 80 | 83 | | | | 12′ Agz.; m. b. | botm | 24 | S. 83° E. | 1.7 | |
| | | | | | dip; e. l | surface. | 2 15 | | | |
| 83 | 84 | 42.3 | 1.02437 | 1.02566 | Luc. sdr. (a) | | | | | |
| 84 | 84 | | | | 12′ Agz.; m. b. | botm | 25 | S. 24° E. | 1.1 | |
| 85 | 84 | 46.5 | 1.02497 | 1.02421 | Luc. sdr. (a) | | | | | [1]Sounding cup lost. |
| 84 | 84 | | | | 12′ Agz.; m. b. | botm | 30 | S. 21° E. | 1.7 | |
| 84 | 84 | 46.5 | 1.02473 | | Luc. sdr. (a) | | | | | |
| 84.5 | 84 | 42.5 | 1.02503 | 1.02556 | Luc. sdr. (a) | | | | | |
| 85 | 85 | | | | 12′ Agz.; m. b. | botm | 20 | N. 78° E. | 1.8 | Net wrecked. |
| 84 | 85 | 43.4 | 1.02433 | 1.02521 | Luc. sdr. (a) | | | | | |
| 84 | 84 | | | | int. 5 § | 310 fms. | 20 24 | S. 73° E. | 2.2 | 550 fms. dredge cable out. |
| | | | | | dip.; e. l | surface. | 2 45 | | | |
| | | | | | K2; K5 | surface. | 15 | | | Towed from row boat. |
| | | | | | dyn | 12–20 ft. | 4 00 | | | 9 shots. |
| 82 | 83 | | 1.02477 | | int. 5 § | 115 fms. | 19 8 | N 76° W. | .7 | 200 fms. dredge cable out. |
| 82 | 83 | | 1.02497 | 1.02359 | Tnr.-Blish sdr. (e). | | | | | |
| 82 | 84 | | | | 12′ Agz.; m. b. | botm | 20 | S. 52° E. | 1.0 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *China Sea, vicinity southern Luzon*—Continued. | | 1908. | | *fms.* | |
| D. 5290 | Matocot Pt., S. 50° E., 3.10 miles (13° 40′ 09″ N., 120° 59′ 30″ E.). | C. S. 4240; Feb., 1907. | July 22 | 10.54 a. m. | *214 | Lav., G. |
| ..... | Verde Id., San Augustine Vill. (rf.). | .....do..... | ...do.... | 1.00 p. m. | ..... | sctrd. Clmps. Co. on sloping bottom. |
| ..... | Verde Id. (E. side) (rf.) | .....do..... | ...do.... | 4.00 p. m. | ..... | dead Co.; S. |
| ..... | Varadero Bay (anch.) | .....do..... | ...do.... | 8.00 p. m. | ..... | |
| ..... | Varadero Bay (N. side) (rf.) | .....do..... | July 23 | 6.00 a. m. | ..... | sctrd. Clmps., sft. Co. |
| ..... | Varadero Bay (beach) | .....do..... | ...do.... | 8.15 a. m. | ..... | S., grassy |
| D. 5291 | Escarceo Lt., N. 39° W., 2.20 miles (13° 29′ 40″ N., 121° 00′ 45″ E.). | .....do..... | ...do.... | 1.27 p. m. | 173 | fne. bk. S. |
| | | | | 1.45 p. m. | 173 | fne. bk. S. |
| D. 5292 | Escarceo Lt., N. 36° W., 3.25 miles (13° 28′ 45″ N., 121° 01′ 12″ E.). | .....do..... | ...do.... | 2.23 p. m. | 162 | fne. bk. S. |
| | | | | 2.37 p. m. | 162 | fne. bk. S. |
| D. 5293 | Escarceo Lt., N. 59° W., 6 miles (13° 28′ 15″ N., 121° 04′ 30″ E.). | .....do..... | ...do.... | 3.42 p. m. | 180 | fne. bk. S. |
| | | | | 3.59 p. m. | 180 | fne. bk. S. |
| ..... | Varadero Bay (fresh-water stream). | .....do..... | July 24 | 6.00 a. m. | ..... | M. |
| D. 5294 | Escarceo Lt., S. 71° W., 2.75 miles (13° 32′ 15″ N., 121° 02′ E.). | .....do..... | ...do.... | 8.54 a. m. | 244 | S., P. |
| | | | | 9.13 a. m. | 244 | S., P. |
| D. 5295 | Escarceo Lt., S. 20° W., 2 miles (13° 33′ 15″ N., 121° E.). | .....do..... | ...do.... | 10.06 a. m. | 231 | gy. S. |
| | | | | 10.26 a. m. | 231 | gy. S. |
| D. 5296 | Matocot Pt., S. 63° E., 4.50 miles (13° 40′ 09″ N., 120° 57′ 45″ E.). | .....do..... | ...do.... | 12.47 p. m. | *210 | M., S.* |
| D. 5297 | Matocot Pt., S. 50° E., 5.10 miles (13° 41′ 20″ N., 120° 58′ E.). | .....do..... | ...do.... | 1.55 p. m. | *198 | M., S.* |
| D. 5298 | Matocot Pt., S. 38° E., 6.70 miles (13° 43′ 25″ N., 120° 57′ 40″ E.). | .....do..... | ...do.... | 3.09 p. m. | *140 | S.* |
| D. 5299 | (20° 05′ N., 116° 05′ E.) | H. O. 798; June, 1885. | Aug. 8 | 8.10 a. m. | 524 | |
| | | | | 8.53 a. m. | 524 | gy. M., S. |
| D. 5300 | (20° 31′ N., 115° 49′ E.) | .....do..... | ...do.... | 2.07 p. m. | 265 | gy. M., S. |
| | | | | 2.29 p. m. | 265 | gy. M., S. |
| | *China Sea, vicinity Hongkong.* | | | | | |
| D. 5301 | (20° 37′ N., 115° 43′ E.) | H. O. 798; June, 1885. | Aug. 8 | 5.06 p. m. | 208 | gy. M., S. |
| | | | | 5.29 p. m. | 208 | gy. M., S. |
| D. 5302 | (21° 42′ N., 114° 50′ E.) | .....do..... | Aug. 9 | 6.43 a. m. | 38 | sft. gy. M. |
| | | | | 6.51 a. m. | 38 | sft. gy. M. |
| D. 5303 | (21° 44′ N., 114° 48′ E.) | .....do..... | ...do.... | 8.21 a. m. | 34 | bl. M. |
| | | | | 8.27 a. m. | 34 | bl. M. |
| D. 5304 | (21° 46′ N., 114° 47′ E.) | .....do..... | ...do.... | 9.06 a. m. | *34 | bl. M. |
| D. 5305 | (21° 54′ N., 114° 46′ E.) | .....do..... | Oct. 24 | 8.07 p. m. | *37 | sft. gy. M. |
| ..... | Pratas Id. (SW. side, beach) | .....do..... | Oct. 25 | 3.00 p. m. | ..... | S., Co., grass |
| ..... | Pratas Id. (SW. side, rf.) | .....do..... | ...do.... | 3.00 p. m. | ..... | sctrd. Clmps. Co., S. |
| D. 5306 | (20° 55′ N., 116° 40′ E.) | .....do..... | Oct. 26 | 8.09 a. m. | 170 | Co., S. |
| | | | | 8.35 a. m. | 170 | Co., S. |
| D. 5307 | (21° 08′ N., 116° 45′ E.) | .....do..... | ...do.... | 10.39 a. m. | 186 | Glob. |
| | | | | 11.04 a. m. | 186 | Glob. |
| D. 5308 | (21° 54′ N., 115° 42′ E.) | .....do..... | Nov. 4 | 6.35 a. m. | 62 | S., M. |
| | | | | 6.43 a. m. | 62 | S., M. |
| D. 5309 | (21° 52′ N., 115° 51′ E.) | .....do..... | ...do.... | 8.20 a. m. | 62 | gn. M. |
| | | | | 8.32 a. m. | 62 | gn. M. |
| | | | | 8.32 a. m. | 62 | |
| D. 5310 | (21° 33′ N., 116° 13′ E.) | .....do..... | ...do.... | 12.36 p. m. | 100 | S., Sh. |
| | | | | 12.51 p. m. | 100 | S., Sh. |
| D. 5311 | (21° 33′ N., 116° 15′ E.) | .....do..... | ...do.... | 1.52 p. m. | 88 | crs. S., Sh. |
| | | | | 1.39 p. m. | 88 | crs. S., Sh. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 84 | 84 | ..... | 1.02482 | 1.02354 | 12′ Agz.; m. b. | botm... | 20 | S. 36° E... | 1.3 | Sounding failed on account of too light lead. Net slightly torn. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 12–25 ft. | 1 30 | ..... | ..... | 4 shots. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 12–25 ft. | 1 00 | ..... | ..... | Do. |
| ..... | ..... | ..... | ..... | ..... | dip.; e. l..... | surface. | 6 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 6–15 ft.. | 4 00 | ..... | ..... | 8 shots. |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 8 ft .... | 3 00 | ..... | ..... | 7 hauls. |
| 86 | 84 | 51.5 | 1.02462 | 1.02468 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 85 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 28° E... | 1.0 | |
| 83 | 84 | 52.4 | 1.02473 | 1.02421 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 13° E... | .9 | |
| 84 | 84 | 57.4 | 1.02457 | 1.02510 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 84.5 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 30 | W..... | .8 | |
| ..... | ..... | ..... | ..... | ..... | 20′ seine..... | 3 ft .... | ..... | ..... | ..... | 6 hauls. |
| 82 | 83 | 48.4 | 1.02580 | 1.02482 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 17 | N. 86° W.. | .6 | Mud bag torn. |
| 83 | 84 | 51.3 | 1.02457 | 1.02513 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 59° W.. | 1.2 | |
| 84 | 84 | ..... | 1.02473 | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 63° E... | 1.2 | |
| 85 | 85 | ..... | 1.02477 | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 69° E... | 1.0 | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 10 | S. 31° E... | .5 | Do. |
| 85.5 | 83 | 42.5 | 1.02396 | 1.02538 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 83.5 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 22 | ..... | ..... | Ship steered circular course. |
| 86 | 85 | ..... | 1.02350 | 1.02430 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | Therm. failed to trip. |
| 87 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | ..... | ..... | |
| 85 | 84 | 50.5 | 1.02433 | 1.02456 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 85 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | ..... | ..... | |
| 84 | 83 | 72.1 | 1.02288 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 15 | ..... | ..... | |
| 85 | 84 | 71.6 | 1.01960 | 1.02386 | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | ..... | ..... | |
| 85.5 | 84 | ..... | ..... | ..... | 12′ Agz..... | botm... | 20 | ..... | ..... | |
| 79 | 78 | ..... | ..... | ..... | 12′ Tnr..... | botm... | 20 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 130′ seine..... | 15 ft .... | 2 00 | ..... | ..... | 3 hauls. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 10–25 ft. | 2 00 | ..... | ..... | 3 shots. |
| 80 | 80 | 51.4 | ..... | 1.02489 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 79.5 | 80 | ..... | ..... | ..... | 12′ Tnr..... | botm... | 20 | ..... | ..... | |
| 80 | 80 | 51.6 | 1.02434 | 1.02510 | Luc. sdr. (a).. | ..... | ..... | ..... | ..... | |
| 80.5 | 80 | ..... | ..... | ..... | 12′ Tnr..... | botm... | 20 | ..... | ..... | |
| 77 | 77 | ..... | 1.02461 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 77 | 78 | ..... | ..... | ..... | 12′ Tnr..... | botm... | 15 | ..... | ..... | |
| 78 | 79 | 73.3 | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 79 | 79 | ..... | ..... | ..... | 12′ Tnr..... | botm... | 20 | ..... | ..... | |
| 79 | 79 | ..... | ..... | ..... | K2 ..... | surface. | 20 | ..... | ..... | Towed from horse block. |
| 80 | 80 | 65.5 | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 80 | 80 | ..... | ..... | ..... | 12′ Tnr..... | botm... | 20 | ..... | ..... | |
| 81 | 80 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 80 | ..... | ..... | ..... | 12′ Tnr.; m. b. | botm... | 20 | ..... | ..... | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *China Sea, vicinity Hongkong*—Continued. | | 1908. | | *fms.* | |
| D. 5312 | (21° 30′ N., 116° 32′ E.) | H. O. 798; June, 1885. | Nov. | 4.05 p. m.<br>4.27 p. m. | 140<br>140 | S., sml. Sh.<br>S., sml. Sh. |
| D. 5313 | (21° 30′ N., 116° 43′ E.) | do | do | 6.20 p. m.<br>6.45 p. m. | 150<br>150 | S.<br>S. |
| D. 5314 | (21° 41′ N., 116° 46′ E.) | do | Nov. 5 | 6.05 a. m.<br>6.25 a. m.<br>6.25 a. m. | 122<br>122<br>122 | S., brk. Sh.<br>S., brk. Sh.<br>S., brk. Sh. |
| | *China Sea, vicinity Formosa.* | | | | | |
| D. 5315 | (21° 40′ N., 116° 58′ E.) | H. O. 798; June, 1885. | Nov. 5 | 8.21 a. m.<br>8.42 a. m. | 148<br>148 | S., Sh.<br>S., Sh. |
| D. 5316 | (21° 39′ N., 117° 07′ E.) | do | do | 10.37 a. m.<br>10.57 a. m. | 159<br>159 | S., Sh<br>S., Sh. |
| D. 5517 | (21° 36′ N., 117° 27′ E.) | do | do | 2.05 p. m.<br>2.31 p. m. | 230<br>230 | S., sml. Sh.<br>S., sml. Sh. |
| D. 5318 | (21° 32′ N., 117° 46′ E.) | do | do | 5.03 p. m.<br>5.32 p. m. | 340<br>340 | S., br. C.<br>S., br. C. |
| D. 5319 | (21° 31′ N., 117° 53′ E.) | do | do | 7.23 p. m. | | |
| H. 4915 | (21° 23′ N., 118° 30′ E.) | do | Nov. 6 | 12.11 a. m. | (?)689 | |
| H. 4916 | (21° 14′ N., 119° 02′ E.) | do | do | 4.32 a. m. | 1,498 | |
| H. 4917 | (21° 06′ N., 119° 38′ E.) | do | do | 10.15 a. m. | 1,758 | sft. br. M. |
| D. 5320 | (20° 58′ N., 120° 03′ E.) | do | do | 2.25 p. m.<br>3.18 p. m. | 1,804<br>1,804 | gy. M.<br> |
| H. 4918 | (20° 46′ N., 120° 52′ E.) | do | do | 9.32 p. m. | 1,220 | sft. M. |
| | Santo Domingo, Batan Id. (rf.). | C. S. 4710; July, 1905. | Nov. 7 | 8.00 a. m. | | Co., Lav |
| | Sabtan Id. (SW. side) (rf.) | do | Nov. 8<br>Nov. 9 | 1.00 p. m.<br>6.00 a. m. | | Co., R<br>Co., R |
| H. 4919 | Ibugos Id. (S. end) N. 77° W., 1 mile (20° 19′ 15″ N., 121° 51′ E.) | do | do | (?)* | 64 | |
| H. 4920 | Ibugos Id. (S. end) N. 81° W., 1.25 miles (20° 19′ 15″ N., 121° 51′ 20″ E.) | do | do | 11.18 a. m. | 46 | |
| D. 5321 | Ibugos Id. (S. end) S. 89° W., 1.25 miles (20° 19′ 30″ N., 121° 51′ 15″ E.) | do | do | 11.23 a. m.<br>11.25 a. m. | 26<br>26 | wh. S., Co., brk. Sh.<br>wh. S., Co., brk. Sh. |
| D. 5322 | Ibugos Id. (S. end) S. 84° W., 1.25 miles (20° 19′ 36″ N., 121° 51′ 15″ E.) | do | do | 11.42 a. m. | 21 | wh. S., Co., brk. Sh. |
| | *China Sea, vicinity of Batanes.* | | | | | |
| D. 5323 | Ibugos Id. (S. end), N. 0° 30′ W., 12 miles (20° 07′ 15″ N., 121° 50′ E.). | C. S. 4710; July, 1905. | Nov. 9 | 1.39 p. m.<br>2.12 p. m. | 303<br>303 | |
| D. 5324 | Ibugos Id. (S. end), N. 15° E., 10.50 miles (20° 09′ N., 121° 47′ E.). | do | do | 3.19 p. m.<br>4.10 p. m. | 564<br>564 | rky.<br>rky. |
| | Port San Pio Quinto, Camiguin Id. (rf.). | C. S. 4711; May, 1907. | Nov. 10 | 9.30 a. m.<br>1.30 p. m. | | Co., R.<br>Co., R. |
| | Port San Pio Quinto (beach) | do | do | 1.30 p. m. | | S., P. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| ° F. | ° F. | ° F. | | | | | h. m. | | mi. | |
| 80 | 80 | 57.5 | 1.02461 | 1.02482 | Luc. sdr. (a) | | | | | |
| 81 | 80 | | | | 12′ Tnr.; m. b. | botm | 17 | | | |
| 78 | 80 | 53.6 | 1.02461 | 1.02513 | Luc. sdr. (a) | | | | | |
| 77 | 80 | | | | 12′ Tnr.; m. b. | botm | 15 | | | |
| 78 | 78 | 59.5 | 1.02461 | 1.02526 | Luc. sdr. (a) | | | | | |
| 78 | 79 | | | | 12′ Tnr.; m. b. | botm | 20 | | | |
| 78 | 79 | | | | K2 | surface | 20 | | | Towed from horse block. |
| 79 | 79 | 54.4 | 1.02500 | 1.02506 | Luc. sdr. (a) | | | | | |
| 80 | 79 | | | | 12′ Tnr.; m. b. | botm | 20 | | | |
| 82 | 80 | 53.4 | 1.02481 | 1.02517 | Luc. sdr. (a) | | | | | |
| 82 | 80 | | | | 12′ Tnr.; m. b. | botm | 25 | | | Mud bag torn. |
| 82 | 80 | 50.6 | 1.02474 | | Luc. sdr. (a) | | | | | |
| 81 | 80 | | | | 12′ Tnr.; m. b. | botm | 20 | | | |
| 81 | 79 | | | | Luc. sdr. (a) | | | | | Sounding outfit lost with 340 fms. wire. |
| 80 | 79 | | | | 12′ Tnr.; m. b. | botm | 6 | | | Bridle stop carried away; net came up, upside down. |
| 79 | 79 | | | | int. 4 § | 20 fms. | 27 | | | 40 fms. dredge cable out. |
| | | | | | | | 6 | | | |
| 79 | 78 | | | | Luc. sdr. (a) | | | | | Sounding outfit lost with 689 fms. wire. May not have reached bottom. |
| 79 | 78 | | | | Luc. sdr. (a) | | | | | Outfit and stray line lost while heaving in. |
| 80 | 80 | | | | Luc. sdr. (a) | | | | | Strong current. |
| 80 | 80 | 36.2 | | 1.02574 | Luc. sdr. (a) | | | | | Therm. possibly tripped at 930 fms. |
| 80 | 80 | | | | int. 4, 2; K2 § | 500 fms. | 20 | | | |
| | | | | | | | 33 | | | |
| 80 | 80 | 36.4 | | | Luc. sdr. (a) | | | | | |
| | | | | | dyn. | 10–20 ft. | 3 30 | | | 8 shots. |
| | | | | | dyn. | 10–25 ft. | 4 00 | | | 9 shots. |
| | | | | | dyn. | 10–25 ft. | 2 00 | | | 2 shots. |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| | | | | | Tnr.-Blish sdr. (e). | | | | | |
| 82 | 81 | | | | Tnr.-Blish sdr. (e). | | | | | |
| 82 | 81 | | | | 9′ Jn. dr. | botm | 4 | N. | 0.2 | |
| 82 | 81 | | | | 9′ Jn. dr. | botm | 9 | N. | .2 | Sounding with hand lead. |
| 81 | 82 | 58.4 | 1.02558 | | Luc. sdr. (a) | | | | | |
| 81 | 82 | | | | 12′ Tnr.; m. b. | botm | 20 | N. 62° W. | 3.2 | |
| 82 | 82 | 40.9 | 1.02523 | 1.02533 | Luc. sdr. (a) | | | | | |
| 78 | 81 | | | | 12′ Tnr.; m. b. | botm | 2 | | | Trawl lost; bridle and mud bag recovered. |
| | | | | | dyn. | 12–20 ft. | 2 30 | | | 2 shots. |
| | | | | | dyn. | 12–25 ft. | 3 00 | | | 3 shots. |
| | | | | | 130′ seine | 10 ft. | 3 00 | | | 5 hauls. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *China Sea, vicinity of Batanes*—Continued. | | 1908. | | *fms.* | |
| ..... | Port San Pio Quinto (beach at head of bay). | C. S. 4711; May, 1907. | Nov. 11 | 9.00 a. m. | ..... | fne. S. |
| ..... | Port San Pio Quinto (rf.) | do | do | 8.30 a. m. | ..... | sctrd. Clmps. Co. |
| | | | | 1.30 p. m. | ..... | sctrd. Clmps. Co. |
| | | | Nov. 12 | 6.00 a. m. | ..... | sctrd. Clmps. Co. |
| | *Off northern Luzon.* | | | | | |
| D. 5325 | Hermanos Id. (N.), N. 86° E., 16.75 miles (18° 34′ 15″ N., 121° 51′ 15″ E.). | C. S. 4711; May, 1907. | Nov. 12 | 10.45 a. m. | 224 | gn. M. |
| | | | | 11.13 a. m. | 224 | gn. M. |
| D. 5326 | Hermanos Id. (N.), N. 69° E., 8 miles (18° 32′ 30″ N., 122° 01′ E.). | do | do | 1.00 p. m. | 230 | M. |
| | | | | 1.28 p. m. | 230 | M. |
| D. 5327 | Hermanos Id. (N.), N. 55° E., 6.80 miles (18° 31′ 30″ N., 122° 03′ E.). | do | do | 2.16 p. m. | 198 | sft. M., fne. S. |
| | | | | 2.39 p. m. | 198 | sft. M., fne. S. |
| ..... | Port San Vicente, Luzon side (beach).[a] | do | Nov. 13 | 2.00 p. m. | ..... | M., S., grass, etc. |
| | | | Nov. 18 | 8.00 a. m. | ..... | M., S., sticks, leaves. |
| ..... | Channel bet. Palaui and San Vicente Islands, Palaui side (beach). | do | do | 3.00 p. m. | ..... | S., M., grass. |
| ..... | Palaui Id. (W. side) (rf.) | do | do | 10.00 a. m. | ..... | sctrd. Co., S. |
| ..... | Palaui Id. (W. side), small stream. | do | do | 2.00 p. m. | ..... | ..... |
| D. 5328 | Hermanos Id., N. 79° E., 28.40 miles (18° 29′ 45″ N., 121° 39′ E.). | do | Nov. 19 | 9.23 a. m. | 150 | bl. M. |
| | | | | 9.44 a. m. | 150 | bl. M. |
| D. 5329 | Font Id. (W.), N. 28° E., 24.25 miles (18° 33′ N., 121° 37′ 30″ E.). | do | do | 10.58 a. m. | 212 | bl. M. |
| | | | | 11.25 a. m. | 212 | bl. M. |
| D. 5330 | Font Id. (W.), N. 24° E., 23.30 miles (18° 33′ 30″ N., 121° 39′ 15″ E.). | do | do | 1.12 p. m. | 178 | br. M. |
| | | | | 1.33 p. m. | 178 | br. M. |
| | *Off western Luzon.* | | | | | |
| D. 5331 | Hermana Menor Id. (E.), N. 13° E., 7.30 miles (15° 36′ 45″ N., 119° 47′ 45″ E.). | C. S. 4712; Sept., 1904. | Nov. 22 | 8.12 a. m. | 178 | S., Sh., M. |
| | | | | 8.41 a. m. | 178 | S., Sh., M. |
| ..... | Port Matalvi (rf.) | do | do | 10.30 a. m. | ..... | sctrd. Co., S. |
| | | | | 1.30 p. m. | ..... | sctrd. Co., S. |
| ..... | Port Matalvi (anch.) | do | do | 7.45 p. m. | ..... | ..... |
| ..... | Port Matalvi (rf.) | do | Nov. 23 | 6.00 a. m. | ..... | sctrd. Co., S. |
| ..... | Port Matalvi (E. side San Salvador Id.) (beach). | do | do | 8.30 a. m. | ..... | S., Co., grass. |
| ..... | Port Matalvi (E. side Macalaba Id. (beach). | do | do | 1.30 p. m. | ..... | S., M., grass. |
| ..... | Port Matalvi (rf.) | do | do | 1.30 p. m. | ..... | sctrd. Co. |
| | *Mindoro Strait.* | | | | | |
| ..... | Paluan Bay, Pantocomi Pt. | C. S. 4345; Feb., 1905. | Dec. 11 | 7.15 a. m. | ..... | R., Co. |
| ..... | Paluan Bay, Lipa Beach | do | do | 8.30 a. m. | ..... | S., P. |
| ..... | Paluan Bay, Paluan River | do | do | 9.00 a. m. | ..... | M. |
| ..... | Paluan Bay, Malugao River | do | do | 2.00 p. m. | ..... | M., sticks, leaves. |
| ..... | Paluan Bay, beach N. of Malugao River. | do | do | 3.00 p. m. | ..... | M. |
| ..... | Paluan Bay, Caluagan River | do | do | 3.00 p. m. | ..... | ..... |
| ..... | Paluan Bay, anch | do | do | 7.00 p. m. | ..... | ..... |

[a] On November 14 a party went up Palaui River about 3 or 4 miles, in prahm, seining with 25-foot and 45-foot seines at intervals along entire distance.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | 130′ seine | 5 ft | 3 00 | | | 7 hauls. |
| | | | | | 25′ seine | 3 ft | 1 30 | | | 12 hauls in small stream. |
| | | | | | 45′ seine | 3 ft | 1 30 | | | 10 hauls in small stream. |
| | | | | | dyn | 12–20 ft. | 3 30 | | | 4 shots. |
| | | | | | dyn | 12–20 ft. | 4 00 | | | |
| | | | | | dyn | 12–25 ft. | 1 00 | | | 2 shots. |
| 81 | 82 | 53.2 | 1.02491 | 1.02525 | Luc. sdr.(a) | | | | | |
| 81 | 82 | | | | 12′ Tnr.; m. b. | botm | 19 | S. 50° E. | 1.0 | |
| 82 | 81 | 55.4 | 1.02437 | 1.02496 | Luc. sdr.(a) | | | | | |
| 81 | 81 | | | | 12′ Tnr.; m. b. | botm | 20 | S. 60° E. | 2.0 | |
| 82 | 82 | (?) | 1.02434 | 1.02468 | Luc. sdr.(a) | | | | | Therm. failed to trip. |
| 81 | 81 | | | | 12′ Tnr.; m. b. | botm | 20 | | | |
| | | | | | 130′ seine | 5 ft | 3 00 | | | 7 hauls. |
| | | | | | 130′ seine | 5 ft | 4 00 | | | Do. |
| | | | | | 130′ seine | 2–4 ft | 1 30 | | | 4 hauls. |
| | | | | | dyn | 10–20 ft. | 5 00 | | | 7 shots in a. m.; several in p. m. |
| | | | | | 45′ seine | | 2 00 | | | 3 hauls. |
| 78 | 79 | 53.9 | 1.02464 | 1.02513 | Luc. sdr.(a) | | | | | |
| 78 | 78 | | | | 12′ Tnr.; m. b. | botm | 20 | N. 52° W. | 1.2 | |
| 79 | 78 | 51.4 | 1.02492 | 1.02593 | Luc. sdr.(a) | | | | | |
| 79 | 78 | | | | 12′ Tnr.; m. b. | botm | 10 | N. 50° W. | 2.2 | |
| 78 | 78 | 53.4 | 1.02516 | 1.02523 | Luc. sdr.(a) | | | | | |
| 78 | 78 | | | | 12′ Tnr.; m. b. | botm | 20 | (?) | (?) | |
| 80.5 | 80 | 54.7 | 1.02422 | 1.02496 | Luc. sdr.(a) | | | | | |
| 80.5 | 80 | | | | 12′ Tnr.; m. b. | botm | 20 | S. 49° E. | 2.0 | |
| | | | | | dyn | 10–20 ft. | 1 30 | | | 3 shots. |
| | | | | | dyn | 10–20 ft. | 3 30 | | | 4 shots. |
| | | | | | dip; e. l. | surf | 1 30 | | | 2 dynamite caps exploded at gangway. |
| | | | | | dyn | 10–30 ft. | 5 00 | | | 8 shots. |
| | | | | | 130′ seine | 4–10 ft. | 3 00 | | | 7 hauls. |
| | | | | | 130′ seine | 2–4 ft | 2 00 | | | 4 hauls. |
| | | | | | dyn | 8–20 ft. | 2 00 | | | 4 shots. |
| | | | | | dyn | 10–20 ft. | 4 15 | | | 4 shots. |
| | | | | | 130′ seine | 8 ft | 3 00 | | | 10 hauls. |
| | | | | | 25′ seine | 2 ft | 2 00 | | | Do. |
| | | | | | 130′ seine | 5 ft | 2 30 | | | 5 hauls. |
| | | | | | 25′ seine | 3 ft | 30 | | | 4 hauls. |
| | | | | | 16′ seine | | | | | |
| | | | | | dip; e. l. | surface. | 1 30 | | | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Mindoro Strait*—Continued. | | 1908. | | *fms.* | |
| ..... | Sablayan Bay, near Sablayan. | C. S. 4345; Feb., 1905. | Dec. 12 | 10.00 a. m. | ..... | Co. |
| D. 5332 | Apo Lt., S. 66° W., 18.2 miles (12° 47′ 15″ N., 120° 41′ E.). | C. S. 4714; June, 1906. | ...do.... | 10.39 a. m.<br>11.50 a. m. | 745 | gn. M. |
| H. 4921 | Apo Lt., S. 65° W., 19.4 miles. | ...do..... | ...do.... | 1.50 p. m. | 584 | gy. M., crs. S. |
| ..... | Sablayan Bay, Sablayan Pt. | C. S. 4345; Feb., 1905. | ...do.... | 3.30 p. m. | ..... | |
| ..... | Sablayan Bay, anch. | .....do..... | ...do.... | 7.00 p. m. | ..... | |
| ..... | Sablayan Bay, Sablayan Pt. | .....do..... | Dec. 13 | 10.00 a. m. | ..... | co. R. |
| ..... | Sablayan Bay, Pandan Id. | .....do..... | ...do.... | 10.00 a. m. | ..... | Co. |
| ..... | Sablayan Bay, Bagaong River. | .....do..... | ...do.... | 10.00 a. m. | ..... | |
| ..... | Sablayan Bay, anch. | .....do..... | ...do.... | 9.00 p. m. | ..... | |
| D. 5333 | Apo Lt., N. 45° W., 19 miles (12° 26′ 30″ N., 120° 37′ 45″ E.). | C. S. 4714; June, 1906. | Dec. 14 | 7.40 a. m.<br>8.26 a. m. | 310 | S. |
| D. 5334 | Apo Lt., N. 44° W., 19.7 miles (12° 25′ 40″ N., 120° 38′ E.). | .....do..... | ...do.... | 9.18 a. m.<br>9.58 a. m.<br>10.17 a. m. | 612 | gy. M. |
| ..... | Tara Id., west. | .....do..... | ...do.... | 3.00 p. m. | ..... | dense Co. |
| ..... | Tara Id., anch. | .....do..... | ...do.... | 7.00 p. m. | ..... | |
| ..... | Tara Id., west. | .....do..... | Dec. 15 | 7.30 a. m. | ..... | |
| ..... | Tara Id., bayou near village. | .....do..... | ...do.... | 7.30 a. m. | ..... | sft. M. |
| ..... | Tara Id., beach near village. | .....do..... | ...do.... | 9.00 a. m. | ..... | S., Co., grass |
| | *Busuanga Id.* | | | | | |
| ..... | Port Caltom. | C. S. 4714; June, 1906. | Dec. 15 | 2.00 p. m. | ..... | sctrd. Co. |
| ..... | Port Caltom, beach near village. | .....do..... | ...do.... | 2.00 p. m. | ..... | S., Co., W. |
| ..... | Port Caltom, anch. | .....do..... | ...do.... | 7.00 p. m. | ..... | |
| ..... | Port Caltom, Pangauran River. | .....do..... | Dec. 16 | 7.00 a. m. | ..... | |
| ..... | Port Uson, Malbato River. | C. S. 4345; Feb., 1905. | Dec. 17 | 1.00 p. m. | ..... | |
| ..... | Port Uson, Mayanpayan Id. | .....do..... | ...do.... | 2.00 p. m. | ..... | sctrd. Co. |
| ..... | Port Uson, anch. | .....do..... | ...do.... | 8.00 p. m. | ..... | |
| | *Linapacan Strait.* | | | | | |
| D. 5335 | Observatory Id. (N.), S. 55° W., 10.7 miles (11° 37′ 15″ N., 119° 48′ 45″ E.). | C. S. 4716; Jan., 1903. | Dec. 18 | 12.22 p. m.<br>12.43 p. m. | 46 | S., M. |
| D. 5336 | Observatory Id. (N.), S. 42° W., 9 miles (11° 37′ 45″ N., 119° 46′ E.). | .....do..... | ...do.... | 1.16 p. m.<br>1.26 p. m. | 46 | S., M. |
| ..... | Linapacan Id., Malcochin Harbor. | .....do..... | ...do.... | 3.30 p. m. | ..... | S., W., Co. |
| ..... | Linapacan Id., Malcochin Harbor, anch. | .....do..... | ...do.... | 8.00 p. m. | ..... | |
| ..... | Linapacan Id., Malcochin Harbor, beach. | .....do..... | Dec. 19 | 8.00 a. m. | ..... | S. Co. |
| ..... | Linapacan Id., Malcochin Harbor reef. | .....do..... | ...do.... | 8.00 a. m. | ..... | sctrd. Co. |
| ..... | Observatory Id., west beach. | .....do..... | ...do.... | 2.30 p. m. | ..... | S., Co., W. |
| ..... | Observatory Id., west. | .....do..... | ...do.... | 2.30 p. m. | ..... | sctrd. Co. |
| | *Palawan Passage.* | | | | | |
| D. 5337 | Observatory Id. (N.), S. 80° E., 13.8 miles (11° 34′ N., 119° 26′ E.). | C. S. 4716; Jan., 1903. | Dec. 20 | 7.31 a. m.<br>7.40 a. m. | 43 | fne. Co., S., M. |
| D. 5338 | Observatory Id. (N.), S. 82° E., 15 miles (11° 33′ 45″ N., 119° 24′ 45″ E.). | .....do..... | ...do.... | 8.04 a. m.<br>8.12 a. m.<br>8.15 a. m. | 43 | Co., S., M. |
| H. 4922 | Cauayan Id. (N.), S. 37° E., 11.5 miles (11° 25′ 45″ N., 119° 14′ E.). | .....do..... | ...do.... | 10.01 a. m. | 21 | Co., S., Sh. |
| D. 5339 | Cauayan Id. (N.), S. 59° E., 10 miles (11° 22′ N., 119° 12′ E.). | .....do..... | ...do.... | 10.32 a. m.<br>10.43 a. m. | 52 | M. |
| ..... | North Guntao Id. | .....do..... | ...do.... | 1.00 p. m. | ..... | Co., S. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907-1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn. | 6-12 ft. | 4 30 | | | 9 shots. |
| 84 | 81 | 38.2 | 1.02385 | 1.02548 | Luc. sdr. (a). | | | | | |
| 82 | 81 | | | | 12′ Tnr.; m. b. | botm. | 20 | | | |
| 83 | 82 | 40.2 | 1.02401 | 1.02535 | Luc. sdr. (a). | | | | | |
| | | | | | dyn. | | 1 30 | | | 4 shots. |
| | | | | | dip; e. l. | surface. | 1 30 | | | |
| | | | | | copper sulphate. | | 2 00 | | | Work done in tide pools. |
| | | | | | dyn. | 6-9 ft. | 2 00 | | | 5 shots. |
| | | | | | 16′ seine. | | 6 00 | | | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| 79 | 80 | 73.8 | 1.02406 | 1.02543 | Luc. sdr. (a). | | | | | |
| 81 | 80 | | | | 12′ Agz.; m. b. | botm. | 22 | | | |
| 81 | 80 | 43.2 | 1.02385 | 1.02516 | Luc. sdr. (a). | | | | | |
| | | | | | K. 2. | surface. | 1 02 | | | |
| 82 | 80 | | | | 12′ Agz.; m. b. | botm. | 7 | S. 60° W. | 2.0 | All gear but mud bag lost. |
| | | | | | dyn. | 10-20 ft. | 2 00 | | | 3 shots. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | dyn. | 10-20 ft. | 4 00 | | | 5 shots. |
| | | | | | 130′ seine. | 3 ft. | 1 30 | | | 2 hauls. |
| | | | | | 25′ seine. | 2 ft. | 1 30 | | | 12 hauls. |
| | | | | | dyn. | 10-20 ft. | 3 00 | | | 8 shots. |
| | | | | | 130′ seine. | 4 ft. | 3 00 | | | 6 hauls. |
| | | | | | dip; e. l. | surface. | 1 30 | | | |
| | | | | | dyn.; 25′ seine. | | 9 00 | | | 10 shots. |
| | | | | | dyn. | | 4 00 | | | |
| | | | | | dyn. | 10-20 ft. | 2 30 | | | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| 82 | 80 | | | | Tnr. sdr. (e). | | | | | Therm. failed to trip. |
| 83 | 81 | | | | 9′ Tnr.; m. b. | botm. | 17 | N. 77° W. | 1.2 | |
| 83 | 81 | | | | Tnr. sdr. (e). | | | | | No therm. used. |
| | | | | | 9′ Tnr.; m. b. | botm. | 6 | N. 80° W. | 1.2 | Lost bottom of net. |
| | | | | | 130′ seine. | 3 ft. | 1 30 | | | 3 hauls. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | 130′ seine. | 3 ft. | 4 00 | | | 7 hauls. |
| | | | | | dyn. | 10-20 ft | 4 00 | | | 11 shots. |
| | | | | | 130′ seine. | 4 ft. | 2 30 | | | 6 hauls. |
| | | | | | dyn. | 15 ft. | | | | 1 shot. |
| 81 | 80 | | 1.02427 | | Tnr. sdr. (e). | | | | | No therm. used. |
| | | | | | 9′ Tnr.; m. b. | botm. | 9 | S. 82° W. | 1.0 | |
| 81 | 80 | | | | Tnr. sdr. (e). | | | | | Do. |
| 81 | 80 | | | | 9′ Tnr.; m. b. | botm. | 20 | N. 70° W. | 1.3 | |
| | | | | | K. 2. | surface. | 20 | | | |
| | | | | | Tnr. sdr. (e). | | | | | Do. |
| 83 | 81 | | 1.02406 | | Tnr. sdr. (e). | | | | | |
| 84 | 81 | | | | 9′ Tnr.; m. b. | botm. | 20 | S. 58° W. | 2.2 | |
| | | | | | ynd. | 24-30 ft. | 2 30 | | | 7 shots. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Malampaya Sound, Palawan Id.* | | 1908. | | *fms.* | |
| ..... | Bolalo Bay, anch..... | C. S. 4349; Aug., 1908. | Dec. 20 | 8.30 p. m. | ..... | ..... |
| ..... | Bolalo Bay, flats near shore.. | ....do..... | Dec. 21 | 8.00 a. m. | ..... | S., Co., W..... |
| ..... | Bolalo Bay, mouth of bay... | ....do..... | ...do.... | 8.00 a. m. | ..... | Co., W..... |
| ..... | Bolalo Bay, head of bay..... | ....do..... | ...do.... | 1.00 p. m. | ..... | ..... |
| ..... | Bolalo Bay, anch..... | ....do..... | ...do.... | 7.30 p. m. | ..... | ..... |
| ..... | Bolalo Bay, near anch..... | ....do..... | ...do.... | 9.00 p. m. | ..... | ..... |
| D. 5340 | Cone Id., N. 2° E., 1.5 miles (10° 55′ 51″ N., 119° 14′ 12″ E.). | ....do..... | Dec. 22 | ..... 8.22 a. m. | 19-24 | ..... |
| ..... | Endeavor Strait, near Relinquish Head. | ....do..... | ...do.... | 9.00 a. m. | ..... | ..... |
| ..... | Endeavor Strait, Chase Head. | ....do..... | ...do.... | 2.00 p. m. | ..... | Co., S..... |
| ..... | Endeavor Strait, Limunancong. | ....do..... | ...do.... | 2.00 p. m. | ..... | S..... |
| ..... | Endeavor Strait, Relinquish Head to Nalinbungan Pt. | ....do..... | Dec. 23 | 8.00 a. m. | ..... | Co., S..... |
| D. 5341 | Endeavor Pt. (W.), S. 18° E., 1.2 miles (10° 57′ 51″ N., 119° 17′ 26″ E.). | ....do..... | ...do.... | ..... 2.03 p. m. | 19-22 | gy. M..... |
| D. 5342 | Endeavor Pt. (S.), S. 58° E., 0.5 miles (10° 56′ 55″ N., 119° 17′ 24″ E.). | ....do..... | ...do.... | ..... 2.35 p. m. | 14-25 | gy. M..... |
| ..... | Endeavor Strait, anch. bet. Bando and Endeavor points. | ....do..... | ...do.... | 8.00 p. m. | ..... | ..... |
| ..... | Endeavor Strait, anch. bet. Bando and Endeavor points. | ....do..... | ...do.... | 8.30 p. m. | ..... | ..... |
| ..... | Malapina Id., N. W..... | ....do..... | Dec. 24 | 8.00 a. m. | ..... | Co., S., W..... |
| ..... | Inner Sound, near Pancol.... | ....do..... | Dec. 25 | 1.00 p. m. | ..... | S., R..... |
| D. 5343 | Cliff Id., S. 22° E., 5.2 miles (10° 51′ 35″ N., 119° 23′ 24″ E.). | ....do..... | Dec. 26 | 7.46 a. m. | *5 | M..... |
| D. 5344 | Cliff Id., S. 34° E., 4.7 miles (10° 50′ 40″ N., 119° 22′ 32″ E.). | ....do..... | ...do.... | ..... 8.22 a. m. | 6 | M..... |
| ..... | Inner Sound, Malampaya River. | ....do..... | ...do.... | 9.00 a. m. | ..... | sft. M..... |
| D. 5345 | Cliff Id., S. 43° E., 4.4 miles (10° 50′ N., 119° 22′ 03″ E.). | ....do..... | ...do.... | ..... 9.16 a. m. | 7 | M..... |
| D. 5346 | Cliff Id., S. 37° E., 4.6 miles (10° 50′ 30″ N., 119° 22′ 20″ E.). | ....do..... | ...do.... | 10.18 a. m. | *7 | M..... |
| D. 5347 | Cliff Id., S. 26° E., 4.5 miles (10° 50′ 44″ N., 119° 23′ 09″ E.). | ....do..... | ...do.... | ..... 10.58 a. m. | 5 | M..... |
| | *Palawan Passage.* | | | | | |
| H. 4923 | Pt. Tabonan, S. 87° E., 11.4 miles (10° 57′ 15″ N., 119° 1′ E.). | C. S. 4716; Jan., 1903. | Dec. 27 | 6.32 a. m. | 51 | Co., S..... |
| H. 4924 | Pt. Tabonan, East, 16.3 miles (10° 57′ N., 118° 55′ 45″ E.). | ....do..... | ...do.... | 7.10 a. m. | 62 | S..... |
| H. 4925 | Pt. Tabonan, S. 87° E., 24.3 miles (10° 58′ 15″ N., 118° 47′ 15″ E.). | ....do..... | ...do.... | 8.05 a. m. | 184 | fne. Co., S..... |
| D. 5348 | Pt. Tabonan, S. 89° E., 33.5 miles (10° 57′ 45″ N., 118° 38′ 15″ E.). | ....do..... | ...do.... | 9.28 a. m. 10.09 a. m. | 375 | Co., S..... |
| D. 5349 | Pt. Tabonan, N. 85° E., 45.2 miles (10° 54′ N., 118° 26′ 20″ E.). | ....do..... | ...do .... | 12.41 p. m. 1.40 p. m. | 730 | Co., S..... |
| D. 5350 | Pt. Tabonan, N. 76° E., 43.7 miles (10° 46′ 40″ N., 118° 29′ E.). | ....do..... | ...do.... | 4.10 p. m. 5.14 p. m. | 515 | gy. M..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | | Trial. | | Drift. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | Apparatus. | Depth. | Duration. | Direction. | Distance. | Remarks. |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | 130′ seine | 2–4 ft. | 3 30 | | | 11 hauls. |
| | | | | | dyn. | 6–9 ft. | 3 30 | | | 5 shots. |
| | | | | | dyn. | | 4 00 | | | 3 shots. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | K2, K5 | surface. | 20 | | | Tow'd from wherry. |
| | | | | | hand line | | | | | |
| 81 | 80 | | | | int. 3 § | 17–22 fms. | 20 1 | N. 3° W. | 0.4 | |
| | | | | | dyn. | | 2 00 | | | 5 shots. |
| | | | | | dyn. | 9–12 ft. | 2 00 | | | 3 shots. |
| | | | | | 25′ and 130′ seines. | 5 ft. | 2 00 | | | 13 hauls. |
| | | | | | dyn. | 18–20 ft. | 6 00 | | | 13 shots. |
| 83 | 82 | | | | hand line | | | | | |
| 83 | 82 | | | | 9′ Tnr.; m. b. | botm. | 15 | S. 2° E. | .7 | |
| 83 | 82 | | | | hand line | | | | | |
| 83 | 82 | | | | 9′ Tnr. | botm. | 19 | S. 25° W. | .7 | Net slightly torn. |
| | | | | | K2; 2′ o. p. | surface. | 20 | | | Towed from steam launch. |
| | | | | | dip; e. l. | surface. | 1 30 | | | |
| | | | | | dyn. | | 3 30 | | | 11 shots. |
| | | | | | dyn. | | 4 00 | | | 3 shots. |
| 80 | 81 | | | | 6′ McC. | botm. | 15 | S. 78° W. | .4 | |
| | | | | | hand line | | | | | |
| 81 | 81 | | | | 6′ McC. | botm. | 26 | S. 18° W. | .7 | |
| | | | | | dyn.; 130′ seine | 3–6 ft. | 6 00 | | | 6 shots, 4 hauls. |
| | | | | | hand line | | | | | |
| 80 | 81 | | | | 9′ Tnr. | botm. | 20 | N. 47° W. | .6 | |
| 81 | 80 | | | | 9′ Tnr. | botm. | 10 | S. 72° E. | 1.0 | |
| | | | | | hand line | | | | | |
| 81 | 81 | | | | 9′ Tnr. | botm. | 10 | N. 36° E. | .5 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| | | | | | Tnr. sdr. (e) | | | | | |
| | | | | | Luc. sdr. (a) | | | | | |
| 82 | 81 | 56.4 | 1.02422 | 1.02576 | Luc. sdr. (a) | | | | | |
| 82 | 81 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 80° W. | 1.5 | No land in sight; latitude and longitude approximate. |
| | | 40.6 | 1.02406 | 1.02564 | Luc. sdr. (a) | | | | | |
| 83 | 81 | | | | 12′ Tnr.; m. b. | botm. | 20 | S. 80° W. | 1.5 | Do. |
| | | | 1.02381 | 1.02523 | Luc. sdr. (a) | | | | | |
| 82 | 80 | | | | 12′ Tnr.; m. b. | botm. | 20 | S. 85° W. | 3.0 | Do. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Palawan Passage*—Cont'd. | | 1908. | | *fms.* | |
| D. 5351 | Pt. Tabonan, N. 62° E., 47 miles (10° 35′ N., 118° 30′ E.). | C. S. 4716; Jan., 1903. | Dec. 27 | 8.43 p. m.<br>8.53 p. m. | 50 | Co., S. |
| | *Ulugan Bay, Palawan Id.* | | | | | |
| ..... | Oyster Inlet | C. S. 4346; Aug., 1905. | Dec. 28 | 9.00 a. m. | ..... | S., Co. |
| ..... | Baheli River to Wood Pt. | ....do..... | ...do..... | 9.30 a. m. | ..... | M., S., W. |
| ..... | Magsiapo Reef | ....do..... | ...do..... | 1.00 p. m. | ..... | Co. |
| ..... | Sagumay Pt. | ....do..... | ...do..... | 1.00 p. m. | ..... | S., Co. |
| ..... | Anchorage (near Tidepole Pt.). | ....do..... | ...do..... | 8.30 p. m. | ..... | |
| ..... | Rita Id. (W. and S.) | ....do..... | Dec. 29 | 8.00 a. m. | ..... | S., Co. |
| ..... | Caiholo River | ....do..... | ...do..... | 11.00 a. m. | ..... | G., bowlders. |
| D. 5352 | Tidepole Pt., S. 84° W., 0.4 mile (10° 04′ 30″ N., 119° 05′ E.). | ....do..... | Dec. 30 | .....<br>6.18 a. m. | 25 | M. |
| | *Nakoda Bay, Palawan Id.* | | | | | |
| ..... | Sirinao Id. (SW.) | C. S. 4346; Aug., 1905. | Dec. 30 | 3.00 p. m. | ..... | S., W. |
| ..... | River (unnamed), SE. of Maricaban Id. | ....do..... | Dec. 31 | 6.00 a. m. | ..... | M., S., G. |
| | *Balabac Strait.* | | 1909. | | | |
| D. 5353 | Cape Melville Lt., S. 85° E., 16.8 miles (7° 50′ 45″ N., 116° 43′ 15″ E.). | C. S. 4309; Nov., 1906. | Jan. 1 | 6.33 a. m.<br>7.10 a. m. | 148 | ..... |
| D. 5354 | Cape Melville Lt., N. 85° E., 16.8 miles (7° 47′ 50″ N., 116° 43′ 15″ E.). | ....do..... | ...do..... | 8.33 a. m.<br>9.55 a. m. | 117 | M. |
| | *North Balabac Strait.* | | | | | |
| ..... | Caxisigan Id. (W.) | C. S. 4347; Dec., 1905. | Jan. 2 | 1.00 p. m. | ..... | Co., S. |
| ..... | Port Ciego, Martinez Pt. | ....do..... | Jan. 3 | 9.00 a. m. | ..... | W., Co. |
| ..... | Port Ciego, Paz Id. | ....do..... | ...do..... | 9.00 a. m. | ..... | W., Co. |
| ..... | Candaraman Id. (E.) | ....do..... | Jan. 4 | 8.30 a. m. | ..... | S., Co. |
| ..... | Bugsuk Id. (S.) | C. S. 4309; Nov., 1906. | Jan. 5 | 8.00 a. m. | ..... | S., Co. |
| D. 5355 | Balabac Lt., S. 61° W., 16.6 miles (8° 08′ 10″ N., 117° 19′ 15″ E.). | ....do..... | ...do..... | 9.40 a. m.<br>9.52 a. m. | 44 | Co., S. |
| D. 5356 | Balabac Lt., S. 64° W., 15.5 miles (8° 06′ 40″ N., 117° 18′ 45″ E.). | ....do..... | ...do..... | 10.21 a. m.<br>10.36 a. m. | 58 | S., Sh. |
| D. 5357 | Balabac Lt., S. 65° W., 14.3 miles (8° 06′ N., 117° 17′ 10″ E.). | ....do..... | ...do..... | 11.13 a. m.<br>11.27 a. m. | 68 | Co., S. |
| | *Jolo Sea.* | | | | | |
| ..... | Taganak Id. (SE.) | C. S. 4720; Jan., 1904. | Jan. 7 | 1.00 p. m. | ..... | Co. |
| D. 5358 | Sandakan Lt., S. 34° W., 19.7 miles (6° 06′ 40″ N., 118° 18′ 15″ E.). | ....do..... | ...do..... | 7.20 p. m.<br>7.29 p. m. | 39 | M. |
| ..... | Cagayan de Jolo (S.) | C. S. 4348; June, 1905. | Jan. 8 | 8.30 a. m.<br>9.00 a. m. | ..... | Co., S.<br>S., Co., W. |
| ..... | Cagayan de Jolo, Sinuan Lake. | ....do..... | ...do..... | 3.00 p. m. | ..... | M. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 81 | 80 | | | | 12′ Tnr.; m. b. | botm. | 2 | | | Net wrecked; latitude and longitude approximate. |
| | | | | | dyn. | | 3 00 | | | 12 shots. |
| | | | | | 130′ seine | 2–5 ft. | 5 00 | | | 9 hauls. |
| | | | | | dyn. | | 2 30 | | | 2 shots. |
| | | | | | dyn. | | 2 00 | | | Do. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | 250′ seine; dyn. | 20–40 ft. | 2 00 | | | 2 hauls, 6 shots. |
| | | | | | 25′ seine | | 3 00 | | | |
| | | | | | hand line | | | | | |
| 80 | 81 | | | | int. 4. § | 24 fms. | 20 2 | N. 4° E. | 0.9 | |
| | | | | | 130′ seine | 4–10 ft. | 1 30 | | | 5 hauls. |
| | | | | | dyn.; 16′–45′ seine. | | 10 00 | | | |
| | | | | | Luc. sdr. (a) | | | | | 148 fms. sounding wire lost. |
| 75 | 80 | | | | 9′ Tnr.; m. b. | botm. | 34 | SE. | | Foggy; latitude and longitude approximate. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 75 | 80 | | | | 9′ Tnr.; m. b. | botm. | 25 | SE. | | Do. |
| | | | | | dyn. | 15 ft. | | | | |
| | | | | | dyn. | 12 ft. | 4 00 | | | 5 shots. |
| | | | | | dyn. | | 4 30 | | | 6 shots. |
| | | | | | dyn. | 9 15 ft. | 2 30 | | | 15 shots. |
| | | | | | dyn. | 9 18 ft. | 4 00 | | | Do. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 85 | 82 | | 1.02518 | | 6′ McC. | botm. | 19 | S. 14° W. | 1.6 | |
| 85 | 82 | | | | Tnr. sdr. (e) | | | | | |
| 85 | 82 | | | | 6′ McC. | botm. | 16 | S. 50° W. | 1.3 | |
| 85 | 82 | | | | Tnr. sdr. (e) | | | | | |
| | | | | | 9′ Tnr.; m. b. | botm. | 01 | N. 45° E. | .6 | Net torn. |
| | | | | | dyn. | 15 ft. | 4 00 | | | 10 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 80 | 82 | | | | 12′ Agz.; m. b. | botm. | 14 | N. 56° E. | .7 | |
| | | | | | dyn. | | 3 00 | | | 5 shots. |
| | | | | | 130′ seine | 2–4 ft. | 2 30 | | | 4 hauls. |
| | | | | | dyn. | 10–40 ft. | 1 00 | | | 5 shots. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Jolo Sea*—Continued. | | 1909. | | *fms.* | |
| H. 4926 | 7° 39′ N., 120° 04′ 45″ E | C. S. 4721; Jan., 1903. | Jan. 9 | 6.11 a. m. | 460 | M |
| D. 5359 | 8° 12′ 45″ N., 120° 37′ 15″ E | do | do | 12.52 p. m.<br>3.31 p. m. | 2,275 | |
| | *Iloilo Strait.* | | | | | |
| | Anilao River, Passi, Panay | | Jan. 13 | | | G |
| | Guimaras Id., vicinity of Buena Vista. | C. S. 4416; Dec., 1907. | Jan. 14 | | | |
| | *Manila Bay.* | | | | | |
| | Mariveles Bay | C. S. 4249; Apr., 1904. | Jan. 28 | 1.00 p. m. | | S |
| | Boca Chica (mouth of North Channel). | C. S. 4240; Feb., 1907. | Jan. 29 | a.m.-p.m. | | |
| | Pucot River (near Mariveles) | C. S. 4249; Apr., 1904. | do | 8.00 a. m. | | |
| | Mariveles River | do | Jan. 30 | 1.00 p. m. | | |
| | Mariveles Bay and Pucot River. | do | do | 3.00 p. m. | | |
| | Luzon Point | C. S. 4240; Feb., 1907. | Jan. 31 | 7.30 a. m. | | |
| | Mariveles wharf | C. S. 4249; Apr., 1904. | Feb. 1 | 8.00 a. m. | | |
| | Mariveles Bay (west) | do | do | 2.00 p. m. | | |
| | La Monja (Id.) | C. S. 4240; Feb., 1907. | Feb. 7 | —— a. m. | | |
| | Luzon Pt | do | do | —— p. m. | | |
| D. 5360 | Corregidor Lt., N. 74° W., 6.9 miles (14° 21′ N., 120° 41′ E.). | do | do | 7.25 p. m. | 12 | hrd |
| | Limbones Cove | do | Feb. 8 | p. m. | | |
| | do | do | do | - - p. m. | | sctrd. Co |
| D. 5361 | Corregidor Lt., S. 89° W., 7.2 miles (14° 24′ 15″ N., 120° 41′ 30″ E.). | do | do | 8.48 p. m. | *12 | |
| | *China Sea, off western Luzon.* | | | | | |
| D. 5362 | Cape Santiago Lt., S. 35° E., 14.6 miles (13° 58′ 20″ N., 120° 30′ 30″ E.). | C. S. 4240; Feb., 1907. | Feb. 19 | 3.57 p. m. | *125 | |
| | Pagapas Bay, Luzon | do | Feb. 20 | 8.00 a. m. | | Co |
| | Pagapas Bay, Santiago River | do | do | 8.00 a. m. | | M., G |
| | *Balayan Bay, Luzon.* | | | | | |
| D. 5363 | C. Santiago Lt., S. 79° W., 4.5 miles (13° 47′ 20″ N., 120° 43′ 30″ E.). | C. S. 4240; Feb., 1907. | Feb. 20 | 9.27 a. m. | *180 | |
| D. 5364 | C. Santiago Lt., S. 68° W., 5.4 miles (13° 48′ 30″ N., 120° 43′ 45″ E.). | do | do | 2.40 p. m. | *160 | |
| | Taal anchorage | do | do | 7.30 p. m. | | |
| D. 5365 | C. Santiago Lt., N. 73° W., 6.7 miles (13° 44′ 24″ N., 120° 45′ 30″ E.). | do | Feb. 22 | 9.04 a. m. | *214 | |
| | *Batangas Bay, Luzon.* | | | | | |
| D. 5366 | Escarceo Lt., S. 5° E., 7.7 miles (13° 39′ N., 120° 58′ 30″ E.). | C. S. 4240; Feb., 1907. | Feb. 22 | 1.40 p. m. | *240 | |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Luc. sdr. (a) | | | | | Sounding wire carried away. Latitude and longitude approximate. |
| | | | | | Luc. sdr. (a) | | | | | |
| 83 | 82 | | | | 12′ Agz. rev | | | | | Sounding wire lost. Longitude and latitude approximate. |
| | | | | | dyn | 12–18 ft. | | | | 15 shots; 1 day's work. |
| | | | | | 130′ seine | 20–30 ft. | | | | 11 hauls; all-day expedition. |
| | | | | | 130′ seine | 4–10 ft. | 4 00 | | | 10 hauls. |
| | | | | | 4 trawl lines | | | | | Half of one trawl went adrift. |
| | | | | | 25′ and 130′ seines; dyn. | | | | 3.0 | All-day expedition. |
| | | | | | 25′ seine; dyn. | | | | | Half-day expedition. |
| | | | | | dyn | | 2 00 | | | 13 shots. |
| | | | | | 3 trawl lines | | 10 00 | | | |
| | | | | | dyn | | 2 00 | | | 3 shots. |
| | | | | | 1 trawl line | | | | | |
| | | | | | cod trawls | | | | | |
| | | | | | cod trawls | | | | | |
| | | | | | hand line | | | | | |
| | | | | | 25′ Agz | botm | 1 00 | N. 48° E. | 1.3 | |
| | | | | | cod trawls | | | | | |
| | | | | | dyn | 15–20 ft. | 2 00 | | | 5 shots. |
| 76 | 78 | | | | 25′ Agz | botm | 9 08 | N. 29° E. | 12.0 | |
| | | | | | 3-bd. int. tr | 60 fms. | 12 | N. 58° W. | 1.0 | |
| | | | | | dyn | 15 ft. | 6 00 | | | 8 shots. |
| | | | | | 130′ seine | 4 ft. | 3 00 | | | 5 hauls. |
| | | | | | 25′ Agz | botm | 1 15 | N. 25° E. | 3.0 | |
| | | | | | 25′ Agz | botm | 43 | N. 45° E. | 2.8 | |
| | | | | | dip; e. l. | surface. | 1 30 | | | |
| | | | | | 25′ Agz | botm | 36 | N. 10° W. | 3.0 | |
| 80 | 79 | | | | 3-bd. int. tr | 150 fms. | 20 | N. 6° E. | 2.5 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Verde Island Passage.* | | 1909. | | *fms.* | |
| D. 5367 | Malabrigo Lt., N. 81° E., 8 miles (13° 34′ 37″ N., 121° 07′ 30″ E.). | C. S. 4240; Feb., 1907. | Feb. 22 | 5.10 p. m. | *180 | S.* |
| | *Marinduque Id. and vicinity.* | | | | | |
| ..... | Port Banalacan, Marinduque | C. S. 4453; July, 1904. | Feb. 23 | 7.30 a. m. | ..... | Co., S |
| D. 5368 | Tayabas Lt. (outer), N. 32° W., 21.8 miles (13° 35′ 30″ N., 121° 48′ E.). | C. S. 4714 June, 1906. | ...do.... | 2.08 p. m.<br>2.45 p. m. | 181 | gy. M |
| ..... | Capulaan Bay, Pagbilao, Chica Id. | .....do. .. | Feb. 24 | 7.00 a. m. | ..... | Co |
| ..... | Tayabas River (3 branches) | .....do..... | ...do..... | 7.00 a. m. | ..... | ..... |
| D. 5369 | Tayabas Lt. (outer), N. 50° W., 8.8 miles (13° 48′ N., 121° 43′ E.). | C. S. 4267; Aug., 1907. | ...do.... | 8.04 a. m.<br>8.30 a. m. | 106 | bk. S |
| D. 5370 | Tayabas Lt. (outer), N. 32° W., 11.6 miles (13° 44′ 15″ N., 121° 42′ 30″ E.). | C. S. 4714; June, 1906. | ...do.... | 9.35 a. m.<br>9.58 a. m. | 159 | sft. M |
| D. 5371 | Tayabas Lt. (outer), N. 43° W., 6 miles (13° 49′ 40″ N., 121° 40′ 15″ E.). | C. S. 4267; Aug., 1907. | ...do.... | 2.32 p. m. | *83 | gn. M. (m. b.) |
| D. 5372 | Tabayas Lt. (outer), N. 3° W., 4.5 miles (13° 49′ 12″ N., 121° 36′ 09″ E.). | .....do..... | ...do.... | 3.42 p. m. | *150 | gn. M. (m. b.) |
| ..... | Tayabas Bay, Lucena anchorage. | .....do..... | ...do.... | 8.00 p. m. | ..... | ..... |
| D. 5373 | Tayabas Lt. (outer), N. 20° E., 15 miles (13° 40′ N., 121° 31′ 10″ E.). | C. S. 4714; June, 1906. | Mar. 2 | 9.38 a. m.<br>10.15 a. m. | 338 | sft. M |
| D. 5374 | Tayabas Lt. (outer), N. 9° E., 7.4 miles (13° 46′ 45″ N., 121° 35′ 08″ E.). | .....do..... | ...do.... | 11.57 a. m. | *190 | gy. M. (m. b.) |
| D. 5375 | Tayabas Lt. (outer), N. 49° W., 18.2 miles (13° 42′ 15″ N., 121° 50′ 15″ E.). | .....do..... | ...do.... | 3.05 p. m.<br>3.25 p. m. | 107 | gn. M |
| D. 5376 | Tayabas Lt. (outer), N. 53° W., 18.7 miles (13° 42′ 50″ N., 121° 51′ 30″ E.). | .....do..... | ...do.... | 4.19 p. m. | *90 | gy. M., S. (m. b.) |
| ..... | Pitogo Anchorage, Luzon | .....do..... | Mar. 3 | 6.00 a. m. | ..... | Co |
| ..... | Mompog Id. (S.) | .....do..... | ...do.... | 10.00 a. m. | ..... | Co., S |
| D. 5377 | Mompog Id. (E.), N. 55° W., 9 miles (13° 26′ N., 122° 19′ E.). | C. S. 4715; Apr., 1907. | Mar. 4 | 7.09 a. m.<br>8.03 a. m. | 400 | sft. gn. M |
| D. 5378 | Mompog Id. (E.), N. 38° W., 17 miles (13° 17′ 45″ N., 122° 22′ E.). | .....do..... | ...do.... | 10.02 a. m.<br>10.40 a. m. | 395 | sft. gn. M |
| H. 4927 | Mompog Id. (E.), N. 37° W., 25.6 miles (13° 10′ 35″ N., 122° 27′ 30″ E.). | .....do..... | ...do.... | 1.06 p. m. | 730 | ..... |
| D. 5379 | Mompog Id. (E.), N. 30° W., 37 miles (12° 59′ 15″ N., 122° 30′ 40″ E.). | .....do..... | ...do.... | 2.46 p. m.<br>4.02 p. m. | 920 | ..... |
| D. 5380 | Mompog Id. (E.), N. 31° W., 33 miles (13° 02′ 45″ N., 122° 29′ E.). | .....do..... | ...do.... | 7.26 p. m. | ..... | ..... |
| | *Burias Id.* | | | | | |
| ..... | Alimango Bay | C. S. 4715; Apr., 1907. | Mar. 5 | 8.00 a. m. | ..... | Co |
| ..... | Alimango River | .....do.. .. | ...do.... | 9.00 a. m. | ..... | S., M |
| | *Ragay Gulf, Luzon.* | | | | | |
| ..... | Alibijaban Id.. | C. S. 4715; Apr., 1907. | Mar. 6 | 9.00 a. m. | ..... | Co |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | | Trial. | | Drift. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | Apparatus. | Depth. | Duration. | Direction. | Distance. | Remarks. |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 83 | 80 | | | | 25′ Agz. | botm. | 26 | N. 63° E. | 0 9 | Rear beam broken and iron frame twisted. |
| | | | | | dyn. | 12-24 ft. | | | | 8 shots. |
| | | | | | Luc. sdr. (a) | | | | | |
| 87 | 82 | | | | 12′ Agz.; m. b. | botm. | 37 | N. 22° W. | 6.0 | |
| | | | | | dyn. | | 4 00 | | | 10 shots. |
| | | | | | sml. seines; dyn. | | | | | All-day expedition by 3 parties. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 80 | 79 | | | | 12′ Agz.; m. b. | botm. | 20 | S. 9° W. | 1.7 | |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 80 | 80 | | | | 12′ Agz.; m. b. | botm. | 20 | S. 31° W. | 3.3 | |
| 83 | 80 | | | | 12′ Agz.; m. b. | botm. | 22 | S. 87° W. | .9 | |
| 82 | 81 | | | | 12′ Agz.; m. b. | botm. | 21 | S. 74° E. | 1.5 | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| 82 | 80 | 51.8 | 1.02550 | | Luc. sdr. (a) | | | | | |
| 81 | 80 | | | | 12′ Tnr.; m. b. | botm. | 20 | N. 32° E. | 4.5 | |
| 82 | 80 | | | | 12′ Tnr.; m. b. | botm. | 33 | N. 29° E. | 2.0 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 82 | 80 | | | | 12′ Agz.; m. b. | botm. | 20 | N. 39° W. | 1.5 | |
| 82 | 80 | | | | 12′ Agz.; m. b. | botm. | 22 | N. 11° W. | 1.5 | Net torn in two places near mouth. |
| | | | | | dyn. | 10-20 ft. | 1 00 | | | 1 shot. |
| | | | | | dyn. | 12-18 ft. | 6 00 | | | 15 shots. |
| | | 49.6 | | | Luc. sdr. (a) | | | | | |
| 79 | 80 | | | | 12′ Agz.; m. b. | botm. | 13 | S. 31° E. | 2.5 | Net completely wrecked. |
| | | 50.4 | | | Luc. sdr. (a) | | | | | |
| 80 | 80 | | | | 12′ Agz.; m. b. | botm. | 20 | S. 40° E. | 3.5 | Net wrecked; pieces recovered. |
| 85 | 81 | 50.4 | | | Luc. sdr. (a) | | | | | |
| | | 50.5 | 1.02443 | | Luc. sdr. (a) | botm. | 30 | N. 43° W. | 5.3 | |
| 83 | 81 | | | | 12′ Agz.; m. b. | | | | | |
| 82 | 81 | | | | int. 4 | | | | | Net lost while veering out. |
| | | | | | dyn. | 12-24 ft. | 9 00 | | | 20 shots. |
| | | | | | 130′ seine; dyn. | 4 ft. | 3 00 | | | 2 hauls, 5 shots. |
| | | | | | dyn. | 12-30 ft. | 5 00 | | | 20 hauls. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Ragay Gulf, Luzon*—Cont'd. | | 1909. | | *fms.* | |
| D. 5381 | Arena Pt. (Luzon), S. 68° W., 2.8 miles (13° 14′ 15″ N., 122° 44′ 45″ E.). | C. S. 4715; Apr., 1907. | Mar. 6 | 9.15 a. m.<br>9.35 a. m. | 88 | co. S |
| D. 5382 | Arena Pt. (Luzon), S. 55° W., 3.8 miles (13° 15′ 20″ N., 122° 45′ 30″ E.). | do | do | 10.02 a. m.<br>10.23 a. m. | 128 | M. |
| | *Burias Id.* | | | | | |
| | Port Busin | C. S. 4454; May, 1906. | Mar. 6 | 8.00 p. m. | | |
| | do | do | Mar. 7 | 6.00 a. m. | | Co. |
| | do | do | Mar. 8 | 6.00 a. m. | | Co. |
| | do | do | do | 8.00 a. m. | | |
| D. 5383 | Arena Pt. (Luzon), S. 66° W., 22 miles (13° 22′ N., 123° 02′ 30″ E.). | C. S. 4715; Apr., 1907. | do | 3.08 p. m.<br>3.35 p. m. | 127 | gn. M. |
| D. 5384 | Arena Pt. (Luzon), S. 64° W., 20.7 miles (13° 22′ 15″ N., 123° 01′ 15″ E.). | do | do | 4.03 p. m.<br>4.32 p. m. | 220 | |
| | Port Busin | C. S. 4454; May, 1906. | do | 7.00 p. m. | | |
| | *Ragay Gulf, Luzon.* | | | | | |
| | Refugio Id., Pasacao Anchorage. | C. S. 4454; May, 1906. | Mar. 9 | 8.00 a. m. | | R. |
| D. 5385 | Arena Pt. (Luzon), S. 61° W., 23.7 miles (13° 24′ 50″ N., 123° 03′ 70″ E.). | C. S. 4715. Apr., 1907. | do | 9.22 a. m.<br>9.54 a. m. | 327 | gy. M. |
| | Galvaney Id. (near Caima Bay). | do | do | 3.00 p. m. | | Co. |
| D. 5386 | Arena Pt. (Luzon), S. 5° W., 25.3 miles (13° 38′ 30″ N., 122° 44′ 30″ E.). | do | do | 3.25 p. m.<br>3.55 p. m. | 287 | |
| | Ragay Bay (anchorage) | do | do | 7.00 p. m. | | |
| | Ragay River | do | Mar. 10 | 7.30 a. m. | | S. |
| | Ragay Bay | do | do | 7.30 a. m. | | Co., S. |
| | *Between Burias and Luzon.* | | | | | |
| | Canmahala Bay, Luzon | C. S. 4715; Apr., 1907. | Mar. 11 | 8.00 a. m. | | Co., S. |
| D. 5387 | Bagatao Id. Lt. (outer), S. 80° E., 27 miles (12° 54′ 40″ N., 123° 20′ 30″ E.). | do | do | 1.06 p. m.<br>1.42 p. m. | 209 | soft gn. M. |
| D. 5388 | Bagatao Id. Lt. (outer), S. 86° E., 21 miles (12° 51′ 30″ N., 123° 26′ 15″ E.). | do | do | 2.51 p. m.<br>3.27 p. m. | 226 | soft gn. M. |
| | Bagatas Id. (anchorage) | do | do | 7.15 p. m. | | |
| | *Between Ticao Id. and Luzon.* | | | | | |
| D. 5389 | Bagatao Id. Lt. (outer), N. 3° W., 14 miles (12° 35′ 45″ N., 123° 48′ 18″ E.). | C. S. 4219; Dec., 1904. | Mar. 12 | 1.46 p. m. | *109–80 | S.* |
| D. 5390 | Bagatao Id. Lt. (outer), N. 12° W., 19 miles (12° 30′ 54″ N., 123° 51′ 30″ E.). | do | do | 2.56 p. m. | *54 | fne. S.* |
| | *Between Samar and Masbate.* | | | | | |
| | Escarpada Id., Bagacay Bay | C. S. 4220; May, 1907. | Mar. 13 | 6.00 a. m. | | Co., S. |
| | Destacado Id., Lode Bay | do | do | 8.09 a. m. | | R., Co. |
| D. 5391 | Tubig Pt. (Destacado Id.), N. 31° E., 3 miles (12° 13′ 15″ N., 124° 05′ 03″ E.). | do | do | 9.07 a. m. | *118 | |
| D. 5392 | Tubig Pt., N. 49° E., 5 miles (12° 12′ 35″ N., 124° 02′ 48″ E.). | do | do | 9.54 a. m.<br>10.10 a. m. | 135 | gn. M., S. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 82 | 80 | | | | 12′ Agz.; m. b. | botm... | 15 | N. 13° E.. | 1.3 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 83 | 79 | | | | 12′ Agz.; m. b. | botm... | 15 | N. 18° E.. | 1.5 | |
| | | | | | 2 gill nets | surface. | | | | Hauled 6 a. m. on 8th. |
| | | | | | dyn. | 10–18 ft. | 2 30 | | | 4 shots. |
| | | | | | dyn. | 10–20 ft. | 5 00 | | | 9 shots. |
| | | | | | copper sulphate. | | 2 00 | | | Beach and tide pools. |
| | | 62.5 | | | Luc. sdr. (a) | | | | | |
| 84 | 80 | | 1.02293 | | 12′ Agz.; m. b. | botm... | 20 | N. 70° W.. | 1.3 | |
| | | 62.4 | | | Luc. sdr. (a) | | | | | |
| 84 | 80 | | | | 12′ Agz.; m. b. | botm... | 25 | N. 74° W.. | 2.7 | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | dyn. | 12–30 ft. | 4 00 | | | 12 shots. |
| | | 62.4 | | | Luc. sdr. (a) | botm... | 13 | N. 47° W.. | 1.6 | |
| 82 | 78 | | | | 12′ Agz.; m. b. | | | | | |
| | | | | | dyn. | 10–25 ft. | 2 00 | | | 7 shots. |
| | | 62.4 | | | Luc. sdr. (a) | | | | | |
| 83 | 82 | | 1.02487 | | 12′ Agz.; m. b. | botm... | 8 | N. 30° E.. | 1.3 | Net badly torn. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | 16,130 seines; dyn. | 3–5 ft.. | 2 30 | | | Half-day trip. |
| | | | | | dyn. | 4–20 ft.. | 4 00 | | | 10 shots. |
| | | | | | dyn. | 4–30 ft.. | 3 30 | | | 8 shots. |
| | | 52.4 | | | Luc. sdr. (a) | | | | | |
| 85 | 79 | | 1.02503 | | 12′ Agz.; m. b. | botm... | 20 | N. 44° E.. | .8 | |
| | | | | | K2 | surface. | 20 | N. 44° E.. | .8 | |
| | | 51.4 | | | Luc. sdr. (a) | | | | | |
| 84 | 78 | | | | 12′ Agz.; m. b. | botm... | 26 | N. 67° E.. | 1.5 | |
| | | | | | K2 | surface. | 26 | N. 67° E.. | 1.5 | |
| | | | | | dip; e. l. | surface. | 45 | | | |
| 78 | 78 | | | | 3-bd. int. tr... | 40 – 55 fms. | 17 | N. 79° E.. | 1.6 | |
| 79 | 78 | | | | 3-bd. int. tr... | 50 fms.. | 26 | N. 58° E.. | 1.5 | |
| | | | | | dyn. | 5–30 ft.. | 1 00 | | | 2 shots. |
| | | | | | dyn. | 18 ft.... | 4 00 | | | 7 shots. |
| 77 | 77 | | | | 12′ Agz.; m. b. | botm... | 20 | S. 88° W.. | 1.3 | |
| | | | | | K2 | 10 ft.... | 20 | S. 88° W.. | 1.3 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 78 | 77 | | | | 12′ Agz.; m. b. | botm... | 5 | S. 36° W.. | .5 | Net slightly torn. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Between Samar and Masbate*—Continued. | | 1909. | | *fms.* | |
| D. 5393 | Panganalan Pt., Talajit Id., S. 59° E., 14.8 miles (12° 03′ 30″ N., 124° 03′ 36″ E.). | C. S. 4418; Apr., 1906. | Mar. 13 | 1.44 p. m.<br>2.04 p. m. | 136 | hrd. S. |
| D. 5394 | Panalangan Pt., Talajit Id., S. 68° E., 8.1 miles (12° 00′ 30″ N., 124° 05′ 36″ E.). | ....do.... | ...do.... | 2.56 p. m.<br>3.13 p. m. | 153 | gn. M. |
| | *Masbate Island.* | | | | | |
| ..... | Port Cataingan..... | C. S. 4418; Apr., 1906. | Mar. 14 | 9.00 a. m. | ..... | Co. |
| | *Between Samar and Masbate.* | | | | | |
| ..... | Buang B., Talajit Id..... | C. S. 4418; Apr., 1906. | Mar. 15 | 8.00 a. m. | ..... | rky. |
| D. 5395 | Panalangan Pt., Talajit Id., S. 81° E., 2.9 miles (11° 56′ 40″ N., 124° 14′ E.). | ....do.... | ...do.... | 8.38 a. m.<br>8.55 a. m. | 140 | hrd.<br>gn. M. (m. b.) |
| D. 5396 | Panalangan Pt., Talajit Id., S. 78° E., 4.5 miles (11° 57′ N., 124° 12′ 24″ E.). | ....do.... | ...do.... | 9.30 a. m.<br>9.45 a. m. | 137 | hrd.<br>gn. M. (m. b.) |
| D. 5397 | Panalangan Pt., Talajit Id., S. 78° E., 6 miles (11° 57′ 27″ N., 124° 10′ 42″ E.). | ....do.... | ...do.... | 10.21 a. m.<br>10.36 a. m. | 134 | gn. M. |
| | *Between Masbate and Leyte.* | | | | | |
| ..... | Gigantangan Id. (west)..... | C. S. 4418; Apr, 1906. | Mar. 15 | 3.00 p. m. | ..... | limestone. |
| D. 5398 | Gigantangan Id. (S.), S. 45° E., 2.7 miles (11° 35′ 12″ N., 124° 13′ 48″ E.). | ....do.... | ...do.... | 3.03 p. m.<br>3.21 p. m. | 114 | gn. M. |
| | *North of Cebu.* | | | | | |
| ..... | Malapascua Id. (west)..... | C. S. 4718; Dec.,1906. | Mar. 16 | 6.00 a. m. | ..... | R., Co. |
| D. 5399 | Tanguingui Id. Lt., N. 70° W., 22.8 miles (11° 21′ 45″ N., 124° 05′ E.). | ....do.... | ...do.... | 8.54 a. m.<br>9.01 a. m. | 32 | S., Sh. |
| D. 5400 | Tanguingui Id. Lt., N. 77° W., 22.5 miles (11° 24′ 24″ N., 124° 05′ 30″ E.). | ....do.... | ...do.... | 9.34 a. m.<br>9.50 a. m. | 25 | S., Sh. |
| D. 5401 | Tanguingui Id. Lt., N. 79° W., 23 miles (11° 24′ 45″ N., 124° 06′ E.). | ....do.... | ...do.... | 9.58 a. m.<br>10.05 a. m. | 30 | fne. S. |
| | *Between Leyte and Cebu.* | | | | | |
| D. 5402 | Capitancillo Id. Lt., S. 37° W., 16.1 miles (11° 11′ 45″ N., 124° 15′ 45″ E.). | C. S. 4718; Dec.,1906. | Mar. 16 | 1.54 p. m.<br>2.16 p. m. | 188 | gn. M. |
| ..... | Calangaman Id. (north)..... | ....do.... | ...do.... | 2.30 p. m. | ..... | sctd. Co., R. |
| D. 5403 | Capitancillo Id. Lt., S. 46° W., 15.7 miles (11° 10′ N., 124° 17′ 15″ E.). | ....do.... | ...do.... | 2.56 p. m.<br>3.14 p. m. | 182 | gn. M. |
| | *Dupon Bay (Leyte) and vicinity.* | | | | | |
| ..... | Sacaysacay Pt..... | C. S. 4426; May, 1904. | Mar. 17 | 8.30 a. m. | ..... | Co. |
| ..... | Guint River..... | ....do.... | ...do.... | 8.30 a. m. | ..... | |
| D. 5404 | Ponson Id. (N.), S. 79° E., 6.8 miles (10° 50′ N., 124° 26′ 18″ E.). | ....do.... | ...do.... | 8.37 a. m.<br>8.58 a. m. | 190 | M. |
| D. 5405 | Ponson Id. (N.), S. 86° E., 8.5 miles (10° 49′ 20″ N., 124° 24′ 23″ E.). | ....do.... | ...do.... | 9.46 a. m.<br>10.09 a. m. | 262 | hrd. |
| D. 5406 | Ponson Id. (N.), S. 88° E., 10.2 miles (10° 49′ 03″ N., 124° 22′ 30″ E.). | ....do.... | ...do.... | 11.13 a. m.<br>11.41 a. m. | 298 | M. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | | Trial. | | Drift. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | Apparatus. | Depth. | Duration. | Direction. | Distance. | Remarks. |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 82 | 78 | | | | 12′ Agz.; m. b. | botm... | 8 | S. 11° W.. | 1.0 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 80 | 78 | | | | 12′ Agz.; m. b | botm... | 9 | S. 41° W.. | 1.1 | |
| | | | | | dyn | 12 ft ... | 2 00 | | | 4 shots. |
| | | | | | dyn | 18–30 ft. | 4 00 | | | 15 shots. |
| | | | | | Luc. sdr. (e) | | | | | |
| 79 | 78 | | 1.02466 | | 12′ Agz.; m.b.. | botm... | 19 | N. 75° W.. | 1.2 | |
| | | | | | K. 2 | surface. | 19 | N. 75° W.. | 1.2 | |
| | | | | | Luc. sdr. (e) | | | | | |
| 79 | 79 | | | | 12′ Agz; m. b.. | botm... | 20 | N. 66° W.. | 1.5 | |
| | | | | | K. 2 | surface. | 20 | N. 66° W.. | 1.5 | |
| | | | | | Luc. sdr. (e) | | | | | |
| 79 | 79 | | | | 12′ Agz.; m. b. | botm... | 16 | N. 69° W.. | 1.2 | |
| | | | | | K. 2 | surface. | 16 | N. 69° W.. | 1.2 | |
| | | | | | dyn | 12–15 ft. | 1 00 | | | 3 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 81 | 80 | | | | 12′ Agz.; m. b. | botm... | 7 | N. 49° W.. | .5 | |
| | | | | | dyn | 10–20 ft. | 3 30 | | | 14 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 79 | 79 | | | | 6′ McC | botm... | 9 | N. 22° E.. | .5 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 80 | 80 | | 1.02458 | | 6′ McC | botm... | 12 | N. 10° E.. | .4 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 80 | 80 | | | | 6′ McC | botm... | 27 | N. 61° E.. | .9 | |
| | | 55.8 | | | Luc. sdr. (a) | | | | | |
| 81 | 81 | | | | 12′ Agz.; m. b. | botm... | 22 | S. 45° E... | 1.9 | |
| | | | | | K. 2 | surface. | 22 | S. 45° E... | 1.9 | |
| | | | | | dyn | 8–25 ft.. | 2 00 | | | 7 shots. |
| | | 55.7 | | | Luc. sdr. (a) | | | | | |
| 81 | 81 | | | | 12′ Agz | botm... | 29 | S. 55° E... | 1.8 | |
| | | | | | dyn | 12–30 ft. | 7 30 | | | 16 shots. |
| | | | | | dyn | | 7 00 | | | |
| | | 55.4 | | | Luc. sdr. (a) | | | | | |
| 81 | 78 | | | | 12′ Agz | botm... | 26 | S. 74° W.. | 1.8 | |
| | | | | | Luc. sdr. (e) | | | | | |
| 82 | 80 | | | | 12′ Agz | botm... | 20 | S. 82° W.. | 1.9 | |
| | | | | | Luc. sdr. (e) | | | | | |
| 83 | 81 | | | | 12′ Agz | botm... | 27 | N. 81° W.. | 2.0 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Dupon Bay (Leyte) and vicinity*—Continued. | | 1909. | | *fms.* | |
| D. 5407 | Ponson Id. (N.), S. 76° E., 12.2 miles (10° 51′ 38″ N. 124° 20′ 54″ E.). | C. S. 4426; May, 1904. | Mar. 17 | 12.57 p. m.<br>1.28 p. m. | 350 | gn. M. |
| ..... | Anchorage, Dupon Bay | do | do | 7.00 p. m. | | |
| | *Between Cebu and Leyte.* | | | | | |
| D. 5408 | Capitancillo Lt., N. 25° W., 20.8 miles (10° 40′ 15″ N., 124° 15′ E.). | C. S. 4718; Dec., 1906. | Mar. 18 | 8.05 a. m.<br>8.23 a. m. | 159 | gn. M. |
| D. 5409 | Capitancillo Lt., N. 19° W., 22 miles (10° 38′ N., 124° 13′ 08″ E.). | do | do | 9.16 a. m.<br>9.51 a. m. | 189 | gn. M. |
| D. 5410 | Bagacay Pt. Lt., S. 37° W., 7.2 miles (10° 28′ 45″ N., 124° 05′ 30″ E.). | do | do | 11.21 a. m.<br>11.56 a. m. | 385 | gn. M. |
| | *Between Cebu and Bohol.* | | | | | |
| D. 5411 | Lauis Pt. Lt., N. 35° E., 4.7 miles (10° 10′ 30″ N., 123° 51′ 15″ E.). | C. S. 4718; Dec., 1906. | Mar. 23 | 8.18 a. m.<br>8.48 a. m. | 145 | gn. M. |
| D. 5412 | Lauis Pt. Lt., N. 21° E., 5.5 miles (10° 09′ 15″ N., 123° 52′ E.). | do | do | 9.36 a. m.<br>9.58 a. m. | 162 | gn. M. |
| ..... | Pandanon Id. (south) | do | do | 2.30 p. m. | | Co., S. |
| ..... | do | do | do | 2.30 p. m. | | S., Co. |
| ..... | Reef opposite Pandanon Id. | do | Mar. 24 | 7.30 a. m. | | Co., S. |
| D. 5413 | Lauis Pt. Lt., N. 68° W., 10 miles (10° 10′ 35″ N., 124° 03′ 15″ E.). | do | do | 11.34 a. m. | *42 | |
| D. 5414 | Lauis Pt. Lt., N. 67° W., 9.5 miles (10° 10′ 40″ N., 124° 02′ 45″ E.). | do | do | 12.04 p. m. | | |
| D. 5415 | Lauis Pt. Lt., N. 24° W., 7.2 miles (10° 07′ 50″ N., 123° 57′ E.). | do | do | 1.21 p. m.<br>1.41 p. m. | 88 | fne. S. |
| D. 5416 | Lauis Pt. Lt., N. 12° E., 2.9 miles (10° 11′ 30″ N., 123° 53′ 30″ E.). | do | Mar. 25 | 7.20 a. m.<br>7.43 a. m. | 150 | gn. M. |
| D. 5417 | Lauis Pt. Lt., N. 10° E., 3.5 miles (10° 10′ N., 123° 53′ 15″ E.). | do | do | 8.18 a. m.<br>8.40 a. m. | 165 | gy. M., S. |
| D. 5418 | Lauis Pt. Lt., N. 16° E., 5.6 miles (10° 08′ 50″ N., 123° 52′ 30″ E.). | do | do | 9.28 a. m.<br>9.48 a. m. | 159 | gy. M., S. |
| D. 5419 | Lauis Pt. Lt., N. 27° E., 17.8 miles (9° 58′ 30″ N., 123° 46′ E.) | do | do | 1.35 p. m.<br>1.55 p. m. | 175 | gn. M. |
| D. 5420 | Cruz Pt. (Bohol), S. 20° E., 6 miles (9° 49′ 35″ N., 123° 45′ E.) | do | do | 3.33 p. m.<br>3.48 p. m. | 127 | |
| | *Bohol Island.* | | | | | |
| ..... | Maribojoc Bay (anchorage) | C. S. 4718; Dec., 1906. | Mar. 24 | 7.30 p. m. | | |
| ..... | Maribojoc Bay (E. of Cruz Pt.) | do | Mar. 26 | 6.00 a. m. | | Co., R. |
| | *Between Panay and Guimaras.* | | | | | |
| D. 5421 | Lusaran Pt. Lt., S. 27° E., 5 miles (10° 33′ 30″ N., 122° 26′ E.) | C. S. 4718; Dec., 1906. | Mar. 30 | 5.38 p. m.<br>6.10 p. m. | 137 | gn. M. |
| D. 5422 | Lusaran Pt. Lt., S. 80° E., 9.7 miles (10° 31′ N., 122° 18′ 45″ E.) | do | do | 7.17 p. m. | | |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Luc. sdr. (e) | | | | | |
| 82 | 81 | | | | 12′ Agz | botm | 20 | S. 49° E. | 1.6 | |
| | | | | | dip; e. l.; dyn. caps. | surface | 3 00 | | | 2 shots. |
| | | 55.4 | | | Luc. sdr. (a) | | | | | |
| 83 | 80 | | 1.02462 | | 12′ Agz.; m. b | botm | 20 | S. 46° W. | 1.3 | |
| | | | | | K. 2 | surface | 20 | S. 46° W. | 1.3 | |
| | | | | | Luc. sdr. (e) | | | | | |
| 81 | 80 | | | | 12′ Agz.; m. b | botm | 29 | S. 51° W. | 2.0 | |
| | | | | | K | surface | 29 | S. 51° W. | 2.0 | Record incomplete. |
| | | | | | Luc. sdr. (e) | | | | | |
| 82 | 80 | | | | 12′ Agz.; m. b | botm | 14 | S. 3° W. | 1.2 | |
| | | 55.2 | | | Luc. sdr. (e) | | | | | |
| 80 | 81 | | | | 12′ Agz.; m. b | botm | 24 | S. 33° W. | 1.7 | |
| | | | | | K. 2 | surface | 24 | S. 33° E. | 1.7 | |
| | | 54.8 | | | Luc. sdr. (e) | | | | | |
| 81 | 81 | | | | 12′ Agz | botm | 22 | S. 67° E. | 1.7 | |
| | | | | | dyn | 6–12 ft. | 2 30 | | | 4 shots. |
| | | | | | 130′ seine | 5 ft | 5 30 | | | 11 hauls. |
| | | | | | dyn | 10–12 ft. | 1 00 | | | 3 shots. |
| 82 | 82 | | | | 6′ McC | botm | 6 | N. 30° W. | .6 | |
| 82 | 82 | | | | 6′ McC | botm | 9 | N. 23° W. | 1.2 | |
| | | 62.4 | | | Luc. sdr. (a) | | | | | |
| 83 | 81 | | | | 12′ Agz.; m. b | botm | 19 | N. 81° W. | 1.5 | |
| | | 54.4 | | | Luc. sdr. (a) | | | | | |
| 81 | 80 | | | | 12′ Agz | botm | 20 | South | 1.5 | |
| | | 54.4 | | | Luc. sdr. (a) | | | | | |
| 81 | 80 | | | | 12′ Agz | botm | 20 | S. 18° W. | 1.2 | |
| | | 54.4 | | | Luc. sdr. (a) | | | | | |
| 81 | 81 | | | | 12′ Agz | botm | 20 | S. 82° W. | .8 | |
| | | 54.5 | | | Luc. sdr. (a) | | | | | |
| 83 | 81 | | | | 12′ Agz | botm | 20 | S. 74° W. | 1.3 | |
| | | 59 | | | Luc. sdr. (a) | | | | | |
| 83 | 81 | | | | 12′ Agz.; m. b | botm | 17 | S. 54° W. | 1.2 | |
| | | | | | dip; e. l | surface | 1 30 | | | |
| | | | | | dyn | 10–20 ft. | 2 00 | | | 6 shots. |
| | | 58.4 | | | Luc. sdr. (a) | | | | | |
| 84 | 82 | | | | 12′ Agz.; m. b | botm | 19 | S. 70° W. | 1.5 | |
| 84 | 82 | | | | int. 3 | surface | 20 | W. by S. | 1.5 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Jolo Sea.* | | 1909. | | *fms.* | |
| ..... | Cagayan Id., Cagayanes Ids. (NW.). | C. S. 4717; Feb., 1903. | Mar. 31 | 9.00 a. m. | ..... | mgn. Rf..... |
| D. 5423 | Cagayan Id. (S.), S. 11° E., 4.8 miles (9° 38′ 30″ N., 121° 11′ E.) | .....do..... | ...do..... | 9.16 a. m.<br>9.55 a. m. | 508 | gy. M., co. S..... |
| D. 5424 | Cagayan Id. (S.), S. 11° W., 3.4 miles (9° 37′ 05″ N., 121° 12′ 37″ E.). | .....do..... | ...do..... | 12.52 p. m.<br>1.24 p. m. | 340 | co. S..... |
| D. 5425 | Cagayan Id. (S.), S. 14° E., 4 miles (9° 37′ 45″ N., 121° 11′ E.). | .....do..... | ...do..... | 2.20 p. m.<br>2.57 p. m. | 495 | gy. M., co. S..... |
| | *Eastern Palawan and vicinity.* | | | | | |
| ..... | Mantaquin Bay (Palawan).. | C. S. 4716; Feb., 1903. | Apr. 1 | 3.00 p. m. | ..... | S..... |
| ..... | Rasa Id. (southwest)..... | .....do..... | ...do..... | 3.00 p. m. | ..... | sft. Co., R ..... |
| ..... | Malinao River (Palawan)... | .....do..... | Apr. 2 | 8.00 a. m. | ..... | ..... |
| ..... | Rasa Id. (southwest)..... | .....do..... | ...do..... | 9.00 a. m. | ..... | Co..... |
| ..... | Mantaquin Bay..... | .....do..... | ...do..... | 2.30 p. m. | ..... | S., G..... |
| D. 5426 | 30th of June Id., N. 29° E., 12.2 miles (9° 12′ N., 118° 28′ E.). | .....do..... | Apr. 3 | 6.42 a. m.<br>6.44 a. m. | 27 | fne. gy. S..... |
| D. 5427 | 30th of June Id., N. 16° W., 11.5 miles (9° 11′ 30″ N., 118° 37′ 08″ E.). | .....do..... | ...do..... | 8.04 a. m.<br>8.09 a. m. | 37 | S , Sh..... |
| D. 5428 | 30th of June Id., N. 62° W., 19.5 miles (9° 13′ N., 118° 51′ 15″ E.). | .....do..... | ...do..... | 10.14 a. m.<br>11.23 a. m. | 1,105 | gy. M..... |
| H. 4928 | Fondeado Id. (SE.), N. 29 E., 23 miles (9° 34′ 48″ N., 118° 45′ E.). | .....do..... | ...do..... | 3.28 p. m. | 902 | gy. M., fne. co. S ... |
| H. 4929 | Fondeado Id. (SE.), N. 19 E., 19 miles (9° 37′ 30″ N., 118° 48′ 30″ E.). | .....do..... | ...do..... | 4.39 p. m. | 554 | gy. M..... |
| ..... | Iwahig River and tributaries (Pta. Princesa). | C. S. 4343; July, 1903. | Apr. 4 | 7.00 a. m. | ..... | ..... |
| ..... | Puerta Princesa (west of Bancaobancaon Pt.). | .....do..... | Apr. 5 | 6.30 a. m. | ..... | S., R., Co..... |
| D. 5429 | Fondeado Id. (SE.), N. 18 E., 15 miles (9° 41′ 30″ N., 118° 50′ 22″ E.). | C. S. 4716; Feb., 1903. | ...do..... | 7.32 a. m.<br>8.14 a. m. | 766 | gn. M..... |
| ..... | Machesi Id. (southwest)..... | .....do..... | ...do..... | 1.00 p. m. | ..... | S., M., Co..... |
| D. 5430 | Fondeado Ids. (W.), N. 57° W., 10.5 miles (9° 49′ 40″ N., 119° 03′ 20″ E.). | .....do..... | Apr. 6 | 10.07 a. m.<br>10.54 a. m. | 464 | glob. Oz..... |
| ..... | Verde del Sur Id. (south).... | .....do..... | ...do..... | 2.00 p. m. | ..... | Co., G., S..... |
| ..... | .....do..... | .....do..... | ...do..... | 2.00 p. m. | ..... | S..... |
| ..... | .....do..... | .....do..... | ...do..... | 8.00 p. m. | ..... | ..... |
| ..... | Port Langcan, Dumaran Id. (east). | .....do..... | Apr. 7 | 4.00 p. m. | ..... | R., Co..... |
| ..... | .....do..... | .....do..... | ...do..... | 5.30 p. m. | ..... | ..... |
| ..... | Port Langcan, Dumaran Id. (anch.). | .....do..... | ...do..... | 7.30 p. m. | ..... | ..... |
| ..... | Port Langcan, Dumaran Id. (Green Pt.). | .....do..... | Apr. 8 | 7.00 a. m. | ..... | S., Co., G..... |
| ..... | Wreck Bay, Dalaganem Id.. | C. S. 4717; Feb., 1903. | ...do..... | 2.30 p. m. | ..... | R., S., Co..... |
| D. 5431 | Corandagos Id. (NW.), N. 28° E., 4.8 miles (10° 38′ 45″ N., 120° 12′ 45″ E.). | .....do..... | ...do..... | 2.49 p. m.<br>2.54 p. m. | 51 | S..... |
| D. 5432 | Corandagos Id. (NW.), N. 30° E., 5.7 miles (10° 37′ 50″ N., 120° 12′ E.). | .....do..... | ...do..... | 3.26 p. m.<br>3.34 p. m. | 51 | S..... |
| D. 5433 | Corandagos Id. (NW.), N. 35° E., 6.5 miles (10° 37′ 30″ N , 120° 11′ 05″ E.). | .....do..... | ...do..... | 4.04 p. m.<br>4.16 p. m. | 54 | gn. M., co. S ..... |
| D. 5434 | Corandagos Id. (N.), S. 63° W., 7.6 miles (10° 46′ 45″ N., 120° 22′ 45″ E.). | .....do..... | ...do..... | 7.50 p. m. | ..... | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn | 2–50 ft. | 3 00 | | | 6 shots. |
| | | 49.8 | | | Luc. sdr. (a) | | | | | |
| 82 | 82 | | | | 12′ Agz.; m. b. | botm. | 27 | N. W. | 1.5 | |
| | | 50.4 | | | Luc. sdr. (a) | | | | | |
| 81 | 82 | | | | 12′ Agz.; m. b. | botm. | 20 | N. 67° W. | 1.5 | |
| | | 49.4 | | | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz.; m. b. | botm. | 20 | N. 62° W. | 1.2 | |
| | | | | | 130′ seine | 4 ft. | 2 00 | | | 6 hauls. |
| | | | | | dyn | 6–12 ft. | 2 00 | | | 8 shots. |
| | | | | | dyn | | 4 00 | | 5.0 | |
| | | | | | dyn | 8–10 ft. | 3 00 | | | 4 shots. |
| | | | | | 500′ seine | 10 ft. | 2 30 | | | 3 hauls. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 81 | 82 | | | | 6′ McC | botm. | 9 | N. 20° E. | .3 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 81 | 82 | | | | 6′ McC | botm. | 5 | | | Net lost. |
| | | 49.7 | | | Luc. sdr. (a) | | | | | |
| 85 | 83 | | | | 12′ Agz.; m. b. | botm. | 21 | N. by W. | 1.0 | |
| 86 | 83 | 49.4 | | | Luc. sdr. (a) | | | | | |
| 83 | 82 | 49.4 | | | Luc. sdr. (a) | | | | | |
| | | | | | dyn | | 12 00 | | | |
| | | | | | dyn | 4–20 ft. | 2 30 | | | 6 shots. |
| | | | | | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz.; m. b. | botm. | 18 | N. 73° W. | 1.9 | |
| | | | | | dyn | 6–12 ft. | 4 00 | | | 10 shots. |
| | | 50 | | | Luc. sdr. (a) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 25 | N. | 1.5 | |
| | | | | | K. 2 | surface. | 25 | N. | 1.5 | |
| | | | | | dyn | 8–10 ft. | 3 00 | | | 6 shots. |
| | | | | | 130′ seine | 2–4 ft. | 3 00 | | | 20 hauls. |
| | | | | | gill nets | | 12 00 | | | 2 lines. |
| | | | | | dyn | 6–15 ft. | 1 30 | | | 5 shots. |
| | | | | | gill nets | | 12 00 | | | 2 lines. |
| | | | | | dip; e. l. | surface. | 20 | | | |
| | | | | | dyn | 8 ft. | 4 30 | | | 17 shots. |
| | | | | | dyn | 12–18 ft. | 3 00 | | | 6 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 84 | 83 | | | | 6′ McC | botm. | 20 | S. 46° W. | .8 | |
| 84 | 83 | | | | Tnr. sdr. (e) | | | | | |
| | | | | | 6′ McC | botm. | 20 | S. 58° W. | 1.3 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 83 | 83 | | | | 6′ McC | botm. | 20 | S. 44° W. | 1.2 | |
| 83 | 83 | | | | Int. 3 | surface. | 20 | N. 70° E. | .2 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Cuyos Islands.* | | 1909. | | *fms.* | |
| ..... | Cuyo Id. (west)..... | C. S. 4345; Feb., 1905. | Apr. 9 | 8.30 a. m. | ..... | R., Co..... |
| ..... | .....do..... | .....do..... | ...do..... | 8.30 a. m. | ..... | S..... |
| ..... | Bisucay Id. (northeast)..... | .....do..... | ...do..... | 2.00 p. m. | ..... | Co., R..... |
| D. 5435 | Bisucay Id. (NE.), S. 55° E., 1 mile (10° 50′ N., 120° 58′ 10″ E.). | C. S. 4717; Feb., 1903. | ...do..... | 7.50 p. m. | ..... | ..... |
| | *West coast of Luzon, Manila Bay to Lingayen Gulf.* | | | | | |
| D. 5436 | Corregidor Lt., N. 83° E., 5.2 miles (14° 22′ 37″ N., 120° 29′ E.). | C. S. 4240; Feb., 1907. | May 7 | 7.03 p. m. | *32 | ..... |
| ..... | Hermana Mayor Id. (west).. | C. S. 4712; Sept., 1904. | May 8 | 9.00 a. m. | ..... | S., Co..... |
| ..... | Caiman Cove..... | C. S 4210; Sept., 1907. | ...do..... | 3.30 p. m. | ..... | S., Co., R..... |
| ..... | .....do..... | .....do..... | ...do..... | 7.00 p. m. | ..... | M..... |
| D. 5437 | Hermana Mayor Lt., N. 69° E., 4.9 miles (15° 45′ 54″ N. 119° 42′ 45″ E.). | .....do ..... | ...do..... | 10.27 a. m. | ..... | ..... |
| | | | | 12.07 p. m. | ..... | ..... |
| D. 5438 | Hermana Mayor Lt., S. 21° E., 7.5 miles (15° 54′ 42″ N., 119° 44′ 42″ E.). | .....do..... | ...do..... | 3.50 p. m. | 297 | gn. M..... |
| | | | | 4.20 p. m. | ..... | ..... |
| ..... | Caiman Cove..... | .....do..... | May 9 | 6.00 a. m. | ..... | S., Co..... |
| D. 5439 | Hermana Mayor Lt., S. 33° E., 12.6 miles (15° 58′ 15″ N., 119° 40′ 20″ E.). | .....do..... | ...do..... | 9.44 a. m. | 940 | gn. M..... |
| | | | | 10.49 a. m. | ..... | ..... |
| ..... | Bolinao Bay (north of Bolinao). | C. S. 4238; Feb., 1905. | ...do..... | 8.00 p. m. | ..... | ..... |
| ..... | Bolinao Bay (east of village). | .....do..... | May 10 | 6.00 a. m. | ..... | S., Co., R..... |
| ..... | .....do..... | .....do..... | ...do..... | 8.00 a. m. | ..... | S..... |
| D. 5440 | S. Fernando Pt. Lt., N. 82° E., 23.1 miles (16° 33′ 52″ N., 119° 52′ 54″ E.). | C. S. 4209; Oct., 1905. | ...do..... | 1.35 p. m. | 172 | fne. gy. S., Glob... |
| | | | | 2.01 p. m. | ..... | ..... |
| D. 5441 | S. Fernando Pt. Lt., S. 87° E., 18.7 miles (16° 38′ N., 119° 57′ 18″ E.). | .....do..... | ...do..... | 3.20 p. m. | 186 | ..... |
| | | | | 3.47 p. m. | ..... | ..... |
| D. 5442 | S. Fernando Pt. Lt., N. 39° E., 8.4 miles (16° 30′ 36″ N., 120° 11′ 06″ E.). | .....do..... | ...do..... | 6.48 p. m. | 45 | co. S..... |
| | | | | 6.58 p. m. | ..... | ..... |
| ..... | Lingayen G. (east of Pt. Guecet). | .....do..... | May 11 | 10.00 a. m. | ..... | S..... |
| | *East coast of Luzon, San Bernardino Strait to San Miguel Bay.* | | | | | |
| ..... | Matnog Bay..... | C. S. 4258; Jan., 1903. | May 31 | 2.00 p. m. | ..... | Co., R..... |
| ..... | .....do..... | .....do..... | ...do .... | 2.00 p. m. | ..... | S., Co..... |
| ..... | .....do..... | .....do..... | ...do..... | 6.00 p. m. | ..... | ..... |
| ..... | Balicuatro Ids., Biri Channel (southern Biri Id.). | C. S. 4220; May, 1907. | June 1 | 8.00 a. m. | ..... | mgn. Rf..... |
| | | | | 7.00 p. m. | ..... | ..... |
| | | | June 2 | 6.00 a. m. | ..... | mgn. Rf..... |
| ..... | Batag Id. (west, near Leung Pt.). | C. S. 4449; Jan., 1907. | ...do..... | 4.00 p. m. | ..... | Co., co. R..... |
| | | | | 5.00 p. m. | ..... | ..... |
| | | | June 3 | 8.00 a. m. | ..... | Co..... |
| D. 5443 | Atalaya Pt., Batag Id., S. 64° E., 3.6 miles (12° 43′ 05″ N., 125° 01′ E.). | .....do..... | ...do..... | 8.50 a. m. | 241 | co. S., Sh..... |
| | | | | 9.19 a. m. | ..... | ..... |
| D. 5444 | Atalaya Pt., Batag Id., S. 65° E., 5.1 miles (12° 43′ 51″ N., 124° 58′ 50″ E.). | .....do..... | ...do..... | 9.57 a. m. | 308 | gn. M..... |
| | | | | 10.32 a. m. | ..... | ..... |
| D. 5445 | Atalaya Pt., Batag Id., S. 56° E., 5.3 miles (12° 44′ 42″ N., 124° 59′ 50″ E.). | .....do..... | ...do..... | 11.25 a. m. | 383 | gn. M., S..... |
| | | | | 12.01 p. m. | ..... | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn. | 4–16 ft. | 3 0 | | | 7 shots. |
| | | | | | 130′ seine | 3–4 ft. | 2 30 | | | 10 hauls. |
| | | | | | dyn. | 6–18 ft. | 3 00 | | | 9 shots. |
| 83 | 83 | | | | int. 3 | surface. | 21 | W. x N. | 0.7 | |
| 85 | 86 | | | | int. 4 | surface. | 15 | W. | .5 | |
| | | | | | dyn. | 8–10 ft. | 5 00 | | | 5 shots. |
| | | | | | dyn. | 5–12 ft. | 2 00 | | | 4 shots. |
| | | | | | 2 gill nets | 9 fms. | 11 00 | | | |
| 88 | 86 | | | | 6 K. 6 | 100–600 fms. | 36 | N. 61° W. | .9 | |
| 87 | 86 | | | | Int. 4 § | 450 fms. | 27 22 | | | |
| | | 46.2 | | | Luc. sdr. (a) | | | | | |
| 87 | 87 | | | | 12′ Agz.; m. b. | botm. | 21 | S. 5° E. | 1.2 | |
| | | | | | dyn. | 10–12 ft. | 2 00 | | | 8 shots. |
| | | 36.7 | | | Luc. sdr. (a) | | | | | |
| 89 | 87 | | | | 12′ Agz.; m. b. | botm. | 14 | N. 16° W. | 2.5 | Net slightly torn. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | dyn. | 10–12 ft. | 4 00 | | | 7 shots. |
| | | | | | 130′ seine | 4 ft. | 3 00 | | | 5 hauls. |
| | | 53.2 | | | Luc. sdr. (a) | | | | | |
| 86 | 87 | | | | 12′ Agz.; m, b. | botm. | 20 | N. 22° E. | 1.8 | |
| | | 52.2 | | | Luc. sdr. (a) | | | | | |
| 86 | 87 | | | | 25′ Agz. | botm. | 20 | N. 64° E. | 1.8 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 82 | 85 | | | | 25′ Agz. | botm. | 10 34 | S. 12° E. | 15.5 | |
| | | | | | 500′ seine | 4–12 ft. | 4 30 | | | 5 hauls. |
| | | | | | dyn. | 10–12 ft. | 3 00 | | | 5 shots. |
| | | | | | 430′ seine | 5 ft. | 2 30 | | | 3 hauls. |
| | | | | | 3 gill nets | | 12 00 | | | |
| | | | | | dyn. | 12–24 ft. | 7 00 | | | 13 shots. |
| | | | | | 3 gill nets | | 12 00 | | | |
| | | | | | dyn. | 10–12 ft. | 3 00 | | | 7 shots. |
| | | | | | dyn. | 6–15 ft. | 1 30 | | | 6 shots. |
| | | | | | 3 gill nets | | 13 00 | | | |
| | | | | | dyn. | 5–15 ft. | 7 30 | | | 17 shots. |
| | | 51.3 | | | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz. | botm. | 20 | N. 70° W. | 1.9 | |
| | | 45.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 83 | | | | 12′ Agz. | botm. | 17 | N. 65° E. | 1.1 | |
| | | 44.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 83 | | | | 12′ Agz. | botm. | 37 | S. 73° E. | 1.5 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *East coast of Luzon, San Bernardino Strait to San Miguel Bay*—Continued. | | 1909. | | *fms.* | |
| D. 5446 | Atalaya Pt., Batag Id., S. 64° E., 5.3 miles (12° 43′ 51″ N., 124° 59′ 18″ E.). | C. S. 4449; Jan., 1907. | June 3 | 1.25 p. m.<br>1.58 p. m. | 300 | gn. M. |
| D. 5447 | S. Miguel Pt., S. 7° W., 3.5 miles (13° 28′ N., 123° 46′ 18″ E.) | C. S. 4221; June, 1905. | June 4 | 5.37 a. m.<br>6.14 a. m. | 310 | gn. M. |
| ..... | Tabaco Bay (west of S. Miguel Pt.). | C. S. 4237; Mar., 1905. | ...do..... | 8.00 a. m. | ..... | co. S. |
| D. 5448 | S. Miguel Pt., N. 23° E., 1.5 miles (13° 23′ 10″ N., 123° 45′ 19″ E.). | .....do..... | ...do..... | 8.55 a. m. | *47 | ..... |
| ..... | Batan Id. (north, west of Camisog Pt.). | C. S. 4259; Aug., 1906. | ...do..... | 1.00 p. m. | ..... | S., Co. |
| D. 5449 | East Pt. (Batan Id.), S. 43° E., 7.9 miles (13° 21′ 36″ N., 124° 00′ 30″ E.). | C. S. 4221; June, 1905. | ...do..... | 2.38 p. m. | *300 | ..... |
| D. 5450 | East Pt. (Batan Id.), S. 36° E., 9.2 miles (13° 23′ 15″ N., 124° 00′ 30″ E.). | .....do..... | ...do..... | 3.19 p. m.<br>3.52 p. m. | 408 | gn. M., Co. |
| D. 5451 | East Pt. (Batan Id.), S. 38° E., 8.2 miles (13° 22′ 22″ N., 124° 00′ 48″ E.). | .....do..... | June 5 | 7.34 a. m. | *380 | ..... |
| ..... | Batan Id. (southwest, of Batan). | C. S. 4259; Aug., 1906. | ...do..... | 8.00 a. m.<br>1.00 p. m. | ..... | S., Co.<br>tide pools. |
| ..... | Rapurapu Id. (Babayon Pt.). | .....do..... | ...do..... | 1.00 p. m. | ..... | Co. |
| ..... | Albay G., Yuna River. | C. S. 4237; Mar., 1905. | June 7 | 6.00 a. m. | ..... | ..... |
| D. 5452 | Legaspi Lt., S. 38° W., 3 miles (13° 11′ 54″ N., 123° 47′ 10″ E.). | C. S. 4221; June, 1905. | ...do..... | 8.51 a. m. | *110 | ..... |
| D. 5453 | Legaspi Lt., S. 58° W., 4.5 miles (13° 12′ N., 123° 49′ 18″ E.). | .....do..... | ...do..... | 9.44 a. m. | *146 | ..... |
| D. 5454 | Legaspi Lt., S. 64° W., 5.7 miles (13° 12′ N., 123° 50′ 30″ E.). | .....do..... | ...do..... | 10.46 a. m. | *153 | ..... |
| D. 5455 | Legaspi Lt., S. 70° W., 6.7 miles (13° 11′ 51″ N., 123° 51′ 42″ E.). | .....do..... | ...do..... | 11.57 a. m. | *165 | ..... |
| D. 5456 | Legaspi Lt., S. 76° W., 6.7 miles (13° 11′ 10″ N., 123° 51′ 52″ E.). | .....do..... | ...do..... | 12.55 p. m. | *142 | ..... |
| D. 5457 | Legaspi Lt., S. 60° W., 5 miles (13° 12′ N., 123° 49′ 40″ E.). | .....do..... | June 8 | 9.40 a. m. | *146 | ..... |
| ..... | Batan Id., Caracaran Bay. | C. S. 4259; Aug., 1906. | ...do..... | 1.00 p. m. | ..... | S., Co. |
| D. 5458 | Legaspi Lt., S. 84° W., 14 miles (13° 10′ 54″ N., 123° 59′ 38″ E.). | C. S. 4221; June, 1905. | ...do..... | 2.04 p. m. | *200 | ..... |
| D. 5459 | Legaspi Lt., S. 88° W., 14.3 miles (13° 10′ 21″ N., 123° 59′ 54″ E.). | .....do..... | ...do..... | 3.41 p. m. | *201 | ..... |
| ..... | Catanduanes Id., Cabugao Bay (east). | C. S. 4269; Feb., 1909. | June 9 | 9.00 a. m. | ..... | R., Co., grass. |
| ..... | Catanduanes Id., Cabugao River. | .....do..... | ...do..... | 9.00 a. m. | ..... | ..... |
| ..... | Catanduanes Id., Cabugao Bay. | .....do..... | ...do..... | 7.00 p. m. | ..... | ..... |
| ..... | Catanduanes Id., Agojo Pt. | C. S. 4222; Jan., 1909. | June 10 | 8.30 a. m. | ..... | co. S. |
| D. 5460 | Sialat Pt. Lt., N. 24° E., 8.2 miles (13° 32′ 30″ N., 123° 58′ 06″ E.). | .....do..... | ...do..... | 8.37 a. m.<br>9.22 a. m. | 565 | gy. M. |
| ..... | Palumbanes Ids., Porongpong Id. (southwest). | .....do..... | ...do..... | 3.00 p. m. | ..... | S., Co. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Luc. sdr. (a) | | | | | Therm. failed to register. |
| 84 | 83 | | | | 12′ Agz. | botm. | 28 | S. 83° E. | 1.6 | |
| | | 45.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 85 | | | | 12′ Agz. | botm. | 21 | N. 64° E. | 1.5 | |
| | | | | | dyn. | 10–15 ft. | 3 00 | | | 7 shots. |
| 86 | 86 | | | | 12′ Agz.; m. b. | botm. | 21 | S. 64° E. | .8 | |
| | | | | | dyn. | 8–10 ft. | 4 30 | | | 6 shots. |
| 85 | 86 | | | | 12′ Agz.; m. b. | botm. | 21 | N. | 1.4 | |
| | | 42.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 86 | | | | 12′ Agz.; m. b. | botm. | 28 | N. | 1.9 | |
| 79 | 84 | | | | int. 5 § | 280 fms. | 21<br>12 | S. 61° E. | 1.0 | |
| | | | | | dyn. | 10 ft. | 8 00 | | | 10 shots. |
| | | | | | copper sulp'te. | | 2 00 | | | |
| | | | | | dyn. | 8–12 ft. | 4 30 | | | 4 shots. |
| | | | | | 25′ seine; dyn. | | 9 30 | | | |
| 85 | 85 | | | | 12′ Agz. | botm. | 14 | N. 48° E. | 1.0 | |
| 85 | 86 | | | | 12′ Agz. | botm. | 20 | E. | 1.1 | |
| 86 | 86 | | | | 12′ Agz. | botm. | 21 | S. 79° E. | 1.2 | |
| 86 | 86 | | | | 12′ Agz. | botm. | 14 | S. 63° E. | 1.1 | |
| 87 | 86 | | | | int. 4 § | 120 fms. | 19<br>7 | N. 88° W. | 1.3 | |
| 85 | 85 | | | | 12′ Agz. | botm. | 20 | S. 72° E. | 1.4 | |
| | | | | | dyn. | 6–10 ft. | 3 30 | | | 13 shots. |
| 87 | 85 | | | | 12′ Agz. | botm. | 23 | S. 56° E. | .6 | |
| 85 | 85 | | | | 12′ Agz.; m. b. | botm. | 20 | N. 86° W. | .8 | |
| | | | | | dyn. | 10–18 ft. | 2 30 | | | 6 shots. |
| | | | | | dyn.; 25′ seine. | | 8 00 | | | |
| | | | | | dip; e. l. | surface. | 1 30 | | | |
| | | | | | dyn. | 12 ft. | 2 30 | | | 13 shots. |
| | | | | | Luc. sdr. (a) | | | | | Therm. failed to register. |
| 86 | 85 | | | | 12′ Agz.; m. b. | botm. | 14 | N. 43° W. | 2.0 | |
| | | | | | dyn. | 8–20 ft. | 2 30 | | | 5 shots. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *East coast of Luzon, San Bernardino Strait to San Miguel Bay*—Continued. | | 1909. | | *fms.* | |
| ..... | Palumbanes Ids., "West Id." (west). | C. S. 4222; Jan., 1909. | June 11 | 7.00 a. m. | ..... | co. R |
| ..... | Lahuy Id., Pocket Bay (west). | .....do..... | ...do.... | 1.00 p. m. | ..... | co. S |
| ..... | Quinalasag Id., Masamat Bay. | .....do..... | ...do.... | 7.00 p. m. | ..... | ..... |
| ..... | Quinalasag Id., Masamat Bay (east). | .....do..... | June 12 | 6.00 a. m. | ..... | S., Co |
| ..... | Butauanan Id. (west and south). | C. S. 4223; June, 1908. | ...do.... | 2.30 p. m. | ..... | S., Co |
| ..... | Butauanan Id. (south) | .....do..... | June 13 | 6.30 a. m. | ..... | Co., S |
| ..... | Maculabo Id. (west) | C. S. 4715; Apr., 1907. | ...do.... | 3.30 p. m.<br>7.30 p. m. | ..... | Co |
| ..... | .....do..... | .....do..... | June 14 | 6.30 a. m.<br>9.00 a. m. | ..... | Co<br>tide pools |
| ..... | S. Miguel Bay, Colasi Pt.... | C. S. 4223; June, 1908. | ...do.... | 7.00 p. m. | ..... | ..... |
| D. 5461 | Caringo Id. (W.), N. 12° W., 4.9 miles (13° 57′ 42″ N., 123° 06′ 42″ E.). | .....do..... | ...do.... | 7.10 p. m. | 11 | ..... |
| ..... | Canimo Pass, Daet Pt | .....do..... | June 15 | 9.00 a. m. | ..... | Co., S |
| ..... | Canimo Pass, Basut River | .....do..... | ...do.... | 9.00 a. m. | ..... | ..... |
| D. 5462 | Sialat Lt., S. 80° E., 5 miles (13° 40′ 42″ N., 123° 56′ 30″ E.). | C. S. 4222 Jan., 1909. | June 16 | 5.50 a. m.<br>6.44 a. m. | 469 | gy. M |
| ..... | Lagonoy G., Palag Bay (east) | .....do..... | ...do.... | 9.00 a. m. | ..... | Co., R |
| D. 5463 | Sialat Pt. Lt., S. 74° E., 3.9 miles (13° 40′ 57″ N., 123° 57′ 45″ E.). | .....do..... | ...do.... | 10.28 a. m. | *300 | S.* |
| D. 5464 | Sialat Pt. Lt., N. 82° E., 4.4 miles (13° 39′ 15″ N., 123° 57′ 15″ E.). | .....do..... | ...do.... | 2.14 p. m. | *400 | ..... |
| ..... | Lagonoy G., Alto Pt. anch | .....do..... | ...do.... | 7.30 p. m. | ..... | ..... |
| ..... | Lagonoy G., Rosa Id | .....do..... | ...do.... | 7.30 a. m. | ..... | S., Co |
| ..... | Lagonoy G., Bato River | .....do..... | June 17 | 7.30 a. m. | ..... | ..... |
| D. 5465 | Atulayan Id. (E.), S. 50° W., 7.3 miles (13° 39′ 42″ N., 123° 40′ 39″ E.). | .....do..... | ...do.... | 8.39 a. m. | *500 | gy. M. (m. b.) |
| D. 5466 | Atulayan Id. (E.), S. 62° W., 7.7 miles (13° 38′ 36″ N., 123° 41′ 45″ E.). | .....do..... | ...do.... | 10.40 a. m. | *540 | gy. M. (m. b.) |
| ..... | Lagonoy G., Atulayan Bay (south). | .....do..... | ...do.... | 3.00 p. m. | ..... | S., R |
| ..... | Lagonoy G., Atulayan Bay (west). | .....do..... | ...do.... | 6.30 p. m. | ..... | ..... |
| ..... | Lagonoy G., Atulayan Bay (anch.). | .....do..... | ...do.... | 8.00 p. m. | ..... | ..... |
| ..... | Lagonoy G., Nato River | .....do..... | June 18 | 6.30 a. m. | ..... | ..... |
| ..... | Lagonoy G., Atulayan Id. (east). | .....do..... | ...do.... | 7.00 a. m. | ..... | Co., S |
| D. 5467 | Atulayan Id. (S.), S. 79° W., 2.5 miles (13° 35′ 27″ N., 123° 37′ 18″ E.). | .....do..... | ...do.... | 7.52 a. m. | *480 | gy. M. (m. b.) |
| D. 5468 | Atulayan Id. (S.), S. 83° W., 5.7 miles (13° 35′ 39″ N., 123° 40′ 28″ E.). | .....do..... | ...do.... | 9.58 a. m. | *569 | gn. M. (m. b.) |
| D. 5469 | Atulayan Id. (E.), S. 63° W., 4 miles (13° 36′ 48″ N., 123° 38′ 24″ E.). | .....do..... | ...do.... | 1.29 p. m. | *500 | gn. M. (net) |
| D. 5470 | Atulayan Id. (E.), S. 68° W., 6.7 miles (13° 37′ 30″ N., 123° 41′ 09″ E.). | .....do..... | ...do..... | 3.26 p. m. | *560 | M.* |
| ..... | Lagonoy G., Nato anch | .....do..... | ...do..... | 7.30 p. m. | ..... | ..... |
| D. 5471 | Sialat Pt. Lt., N. 71° E., 15 miles (13° 34′ 57″ N., 123° 47′ 06″ E.). | .....do..... | June 19 | 9.17 a. m. | *568 | ..... |
| D. 5472 | Sialat Pt. Lt., N. 63° E., 13.6 miles (13° 33′ 36″ N., 123° 49′ E.). | .....do..... | ...do..... | 11.12 a. m. | *550 | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn. | 8–10 ft. | 2 00 | | | 3 shots. |
| | | | | | dyn. | 12–15 ft. | 3 00 | | | 2 shots. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | dyn. | 10 ft | 3 30 | | | 10 shots. |
| | | | | | dyn. | 8 ft. | 3 00 | | | 9 shots. |
| | | | | | dyn. | 10 ft. | 4 30 | | | 11 shots. |
| | | | | | dyn. | 15–25 ft. | 1 30 | | | 7 shots. |
| | | | | | dip; e. l. | surface. | 1 30 | | | |
| | | | | | dyn. | 8–18 ft. | 4 30 | | | 11 shots. |
| | | | | | copper sulphate. | | 2 00 | | | |
| | | | | | 4 gill nets | | 12 00 | | | |
| 84 | 86 | | | | 25′ Agz. | botm. | 17 | E. | 2.5 | |
| | | | | | dyn. | 5–10 ft. | 2 45 | | | 5 shots. |
| | | | | | small seines | | 10 00 | | 6.0 | |
| | | 41.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 85 | | | | 25′ Agz. | botm. | 17 | S. 35° E. | 1.5 | Bridle stops and one preventer carried away. |
| | | | | | dyn. | 8–25 ft. | 5 30 | | | 24 shots. |
| 83 | 84 | | | | 12′ Agz.; m. b. | botm. | 16 | S. 82° W. | .8 | |
| 84 | 85 | | | | 12′ Agz.; m. b. | botm. | 10 | S. 40° W. | .2 | Bridle stops carried away; net badly torn. |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | dyn. | 8–10 ft. | 4 30 | | | 6 shots. |
| | | | | | dyn. | | 4 30 | | 1.5 | |
| 83 | 84 | | | | 12′ Agz.; m. b. | botm. | 20 | S. 59° E. | 1.6 | |
| 84 | 86 | | | | 12′ Agz.; m. b. | botm. | 22 | S. 63° E. | 1.6 | |
| | | | | | 130′ seine, 2 wings. | 15 ft. | 2 30 | | | 3 hauls. |
| | | | | | 4 gill nets | | 11 00 | | | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| | | | | | 25′ seine | | 11 00 | | 4.5 | |
| | | | | | dyn. | 8–10 ft. | 5 00 | | | 10 shots. |
| 83 | 85 | | | | 12′ Agz.; m. b. | botm. | 42 | N. 89° E. | 2.7 | |
| 85 | 86 | | | | 12′ Agz.; m. b. | botm. | 33 | E. | 2.1 | |
| 84 | 86 | | | | 12′ Agz. | botm. | 42 | N. 86° E. | 2.8 | |
| 84 | 86 | | | | 12′Agz. | botm. | 34 | S. 50° E. | 1.6 | |
| | | | | | dip; e. l. | surface. | 1 00 | | | |
| 80 | 84 | | | | 12′ Agz. | botm. | 29 | S. 60° E. | 2.1 | |
| 83 | 85 | | | | 12′Agz. | botm. | 25 | S. 62° E. | 1.7 | Bridle stops and lashing carried away; load lost. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *East coast of Luzon, San Bernardino Strait to San Miguel Bay*—Continued. | | 1909. | | *fms.* | |
| D. 5473 | East Pt. (Batan), S. 20° E., 8.9 miles (13° 24′ 15″ N., 124° 02′ 48″ E.). | C. S. 4221; June, 1905. | June 19 | 2.05 p. m.<br>2.49 p. m. | 545 | gy. M., S. |
| ..... | Albay G., between Paron and Jesus Pt. | .....do..... | June 21 | 1.00 p. m. | ..... | Co. |
| ..... | Batan Id., East Pt. | C. S. 4259; Aug., 1906. | June 22 | 8.00 a. m. | ..... | Co., S |
| ..... | Rapurapu Id. | .....do..... | ...do..... | 1.00 p. m. | ..... | S., Co. |
| ..... | Batan Id., Batan anch. | .....do..... | ...do..... | 8.00 p. m. | ..... | |
| ..... | Port Gubat (Luzon). | C. S. 4258; Jan., 1903. | June 23 | 1.00 p. m. | ..... | Co., S |
| D. 5474 | S. Bernardino Lt., S. 6° W., 8.4 miles (12° 53′ 48″ N., 124° 18′ E.). | C. S. 4220; May, 1907. | June 24 | 7.18 a. m.<br>7.37 a. m. | 124 | Co. |
| D. 5475 | S. Bernardino Lt., S. 27° W., 11 miles (12° 55′ 26″ N., 124° 22′ 12″ E.). | .....do..... | ...do..... | 8.51 a. m.<br>9.15 a. m. | 195 | Sh. |
| D. 5476 | S. Bernardino Lt., S. 37° W., 13.5 miles (12° 56′ 24″ N., 124° 25′ 24″ E.). | .....do..... | ...do..... | 10.29 a. m.<br>11.02 a. m. | 270 | fne. S. |
| ..... | Langao Pt. (extreme southern Luzon). | .....do..... | ...do..... | 3.30 p. m. | ..... | Co. |
| | *Between Samar and Leyte, vicinity of Surigao Strait.* | | | | | |
| ..... | Bito Lake and River (Leyte). | C. S. 4423; June, 1905. | July 26 | 5.30 a. m. | ..... | |
| ..... | Abuyog (Leyte). | .....do..... | ...do..... | 8.00 a. m. | ..... | S. |
| H. 4930 | Tacbuc Pt. (Leyte), S. 81° W., 16 miles (10° 46′ 24″ N., 125° 17′ 33″ E.). | .....do..... | July 27 | 7.02 a. m. | 93 | S. |
| H. 4931 | Pagbabacnan Pt. (Malhon Id.), S. 79° E., 16.5 miles (10° 45′ 10″ N., 125° 27′ 48″ E.). | .....do..... | ...do..... | 8.12 a. m. | 63 | crs. S., Sh. |
| ..... | Casogoran (Malhon Id.). | .....do..... | ...do..... | 10.30 a. m. | ..... | S., Co. |
| ..... | Gigoso Pt., Quinapundan Bay (Samar). | .....do..... | July 28 | 11.00 a. m. | ..... | S., Co. |
| ..... | San Roque (Leyte). | C. S. 4719; Aug., 1907. | July 29 | 5.30 a. m. | ..... | Co., S. |
| H. 4932 | Tacbuc Pt. (Leyte), N. 79° W., 9.5 miles (10° 42′ 10″ N., 125° 10′ 36″ E.). | .....do..... | ...do..... | 10.02 a. m. | 44 | gy. M. |
| D. 5477 | Tacbuc Pt. (Leyte), S. 87° W., 11 miles (10° 44′ 45″ N., 125° 12′ 30″ E.). | .....do..... | ...do..... | 10.23 a. m.<br>10.33 a. m. | 48 | gy. M. |
| D. 5478 | Tacbuc Pt. (Leyte), S. 80° W., 15.2 miles (10° 46′ 24″ N., 125° 16′ 30″ E.). | C. S. 4423; June, 1905. | ...do..... | 11.33 a. m.<br>11.44 a. m. | 57 | Sh. |
| D. 5479 | Tacbuc Pt. (Leyte), S. 78° W., 16.5 miles (10° 47′ 15″ N., 125° 17′ 50″ E.). | .....do..... | ...do..... | 1.02 p. m.<br>1.16 p. m. | 62 | gy. M. |
| D. 5480 | Tacbuc Pt. (Leyte), S. 87° W., 17.3 miles (10° 44′ 36″ N., 125° 19′ E.). | .....do..... | ...do..... | 2.03 p. m.<br>2.12 p. m. | 62 | fne. S. |
| ..... | Hinunangan Bay (Leyte). | C. S. 4719; Aug., 1907. | July 30 | 7.30 a. m. | ..... | Co., S. |
| D. 5481 | Cabugan Grande Id. (N.), N. 86° W., 3.8 miles (10° 27′ 30″ N., 125° 17′ 10″ E.). | .....do..... | ...do..... | 8.18 a. m.<br>8.28 a. m. | 61 | S., Sh., G. |
| D. 5482 | Cabugan Grande Id. (N.), N. 87° W., 4.5 miles (10° 27′ 30″ N., 125° 18′ E.). | .....do..... | ...do..... | 8.56 a. m.<br>9.11 a. m. | 67 | brk. Sh., S., gn. M. |
| D. 5483 | Cabugan Grande Id. (N.), N. 88° W., 5.7 miles (10° 27′ 30″ N., 125° 19′ 15″ E.). | .....do..... | ...do..... | 9.48 a. m.<br>10.00 a. m. | 74 | S., brk. Sh. |
| D. 5484 | Cabugan Grande Id. (N.), S. 88° W., 6.4 miles (10° 28′ N., 125° 20′ E.). | .....do..... | ...do..... | 10.33 a. m.<br>10.44 a. m. | 76 | S., brk. Sh. |
| H. 4933 | Cabugan Grande Id. (N.), N. 70° W., 9.1 miles (10° 24′ 37″ N., 125° 22′ 15″ E.). | .....do..... | ...do..... | 12.02 p. m. | 90 | gn. M., S., brk. Sh. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | | Trial. | | Drift. | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | Apparatus. | Depth. | Duration. | Direction. | Distance. | Remarks. |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | 40.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 86 | | | | 12′ Agz. | botm. | 15 | S. 41° E. | 1.2 | Bridle stops carried away. |
| | | | | | dyn. | 10 ft. | 4 00 | | | 12 shots. |
| | | | | | dyn. | 7–12 ft. | 3 30 | | | 5 shots. |
| | | | | | dyn. | 10–15 ft. | 5 00 | | | 14 shots. |
| | | | | | dip; e. l. | | 1 00 | | | |
| | | | | | dyn. | 8–15 ft. | 4 00 | | | 11 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 82 | 82 | | | | 12′ Agz. | botm. | 16 | S. 58° W. | .8 | |
| | | 59.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 82 | | | | 12′ Agz. | botm. | 16 | N. 82° W. | 1.2 | |
| | | 48.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 26 | N. 84° W. | 1.0 | |
| | | | | | dyn. | 6–15 ft. | 2 00 | | | 8 shots. |
| | | | | | dyn., sml. seines. | | 12 00 | | 4.0 | |
| | | | | | 130′ seine. | 12 ft. | 4 00 | | | 3 hauls. |
| | | | | | Tnr. sdr. (e) | | | | | |
| | | | | | Tnr. sdr. (e) | | | | | |
| | | | | | dyn. | 9–18 ft. | 6 00 | | | 18 shots. |
| | | | | | dyn. | 6–10 ft. | 5 15 | | | 17 shots. |
| | | | | | dyn. | 8–15 ft. | 5 45 | | | 25 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 86 | 83 | | | | 12′ Agz. | botm. | 20 | S. 64° E. | 1.0 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 87 | 83 | | | | 12′ Agz. | botm. | 14 | S. 74° E. | .7 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 87 | 84 | | | | 12′ Agz. | botm. | 20 | S. 51° E. | .8 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 88 | 84 | | | | 12′ Agz. | botm. | 20 | E. | .7 | |
| | | | | | dyn. | 10–15 ft. | 8 00 | | | 20 shots. |
| | | | | | Tnr. sdr. (e) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 20 | E. by S. | 1.0 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 24 | E. ¼ S. | 1.2 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 21 | N. 58° E. | 1.2 | |
| | | | | | Tnr. sdr. (e) | | | | | |
| 85 | 83 | | | | 12′ Agz. | botm. | 30 | N. 70° E. | 1.2 | |
| | | | | | Tnr. sdr. (e) | | | | | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Between Samar and Leyte, vicinity of Surigao Strait—* Continued. | | 1909. | | *fms.* | |
| D. 5485 | Cabugan Grande Id. (N.), N. 59° W., 10.5 miles (10° 22′ 15″ N., 125° 22′ 30″ E.). | C. S. 4719; Aug.,1907. | July 30 | 12.42 p. m.<br>12.57 p. m. | 103 | gn. M. |
| | *Between Leyte and Mindanao.* | | | | | |
| D. 5486 | Botobolo Pt. (Panaon Id.), S. 19° W., 6 miles (10° 02′ N., 125° 19′ 20″ E.). | C. S. 4719; Aug. 1907. | July 31 | 8.37 a. m.<br>9.20 a. m. | 585 | |
| D. 5487 | San Ricardo Pt. (Panaon Id.), S. 50° E., 11.2 miles (10° 02′ 45″ N., 125° 05′ 33″ E.). | do | do | 1.11 p. m.<br>2.03 p. m. | 732 | gn. M. |
| D. 5488 | San Ricardo Pt. (Panaon Id.), S. 59° E., 9 miles (10° N., 125° 6′ 45″ E.). | do | do | 3.59 p. m.<br>4.52 p. m. | 772 | gn. M. |
| D. 5489 | San Ricardo Pt. (Panaon Id.), N. 42° E., 6.6 miles (9° 50′ 30″ N., 125° 10′ E.) | do | do | 7.21 p. m. | | |
| D. 5490 | San Ricardo Pt., N. 9° E., 23.9 miles (9° 32′ N , 125° 11′ E.) | do | Aug. 1 | 5.10 a. m.<br>6.20 a. m. | 830 | gn. M. |
| D. 5491 | Diuata Pt. (W.), S. 9° W., 19.3 miles (9° 24′ N., 125° 12′ E.). | do | do | 8.25 a. m.<br>10.12 a. m. | 736 | gn. M., Co. |
| D. 5492 | Diuata Pt. (W.), S. 45° W., 15.2 miles (9° 12′ 45″ N., 125° 20′ E.). | do | do | 12.42 p. m.<br>1.31 p. m. | 735 | gy. M. |
| D. 5493 | Diuata Pt. (N.), N. 84° W., 5.5 miles (9° 04′ N., 125° 20′ E.). | do | Aug. 2 | 6.13 a. m.<br>7.03 a. m. | 478 | gn. M. |
| D. 5494 | Diuata Pt. (N.), N. 74° W., 4.2 miles (9° 06′ 30″ N., 125° 18′ 40″ E.). | do | do | 8.30 a. m.<br>9.17 a. m. | 678 | gn. M., S. |
| D. 5495 | Diuata Pt. (N.), S. 76° E., 9.4 miles (9° 06′ 30″ N., 125° 00′ 20″ E.). | do | do | 12.44 p. m.<br>1.54 p. m. | 976 | gy. M. |
| ..... | Mahinog River, Camiguin Id. (mouth). | do | Aug. 3 | 2.30 a. m. | | |
| ..... | Mahinog, Camiguin Id. | do | do | 6.30 a. m. | | S., Co. |
| D. 5496 | Bantigui Id., N. 64° W., 7 miles (9° 08′ 26″ N., 124° 57′ E.). | do | do | 7.40 a. m.<br>8.46 a. m. | 788 | |
| D. 5497 | Bantigui Id., N. 64° W., 10 miles (9° 07′ 15″ N., 124° 59′ 30″ E.). | do | do | 9.55 a. m.<br>10.59 a. m. | 960 | gn. M., fne. S. |
| D. 5498 | Bantigui Id., N. 64° W., 10 miles (9° 07′ 15″ N., 124° 59′ 30″ E.). | do | do | 2.50 p. m. | 960 | gn. M., fne. S. |
| | *Northern Mindanao and vicinity.* | | | | | |
| D. 5499 | Macabalan Pt. Lt. (Mindanao), S. 20° E., 11.6 miles (8° 41′ 30″ N., 124° 35′ 40″ E.). | C. S. 4719; Aug.,1907. | Aug. 4 | 9.10 a. m.<br>9.50 a. m. | 554 | gn. M., fne. S. |
| D. 5500 | Macabalan Pt. Lt. (Mindanao), S. 20° E., 7.9 miles (8° 37′ 45″ N., 124° 36′ 45″ E.). | do | do | 11.05 a. m.<br>11.25 a. m. | 267 | gn. M. |
| ..... | Opol, Macajalar Bay (Mindanao). | C. S. 4644; July. 1905. | do | 1.00 p. m. | | S., Co. |
| D. 5501 | Macabalan Pt. Lt. (Mindanao), S. 35° E., 8.2 miles (8° 37′ 37″ N., 124° 35′ E.). | C. S. 4719; Aug.,1907. | do | 1.50 p. m.<br>2.28 p. m. | 214 | fne. S., gy. M. |
| D. 5502 | Macabalan Pt. Lt. (Mindanao), S. 35° E., 8.2 miles (8° 37′ 37″ N., 124° 35′ E.). | do | do | 3.28 p. m. | *214 | |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | Tnr. sdr. (e) | | h. m. | | mi. | |
| 85 | 83 | | | | 12′ Agz. | botm. | 20 | N. 40° E. | 1.7 | |
| | | 52.1 | | | Luc. sdr. (a) | | | | | |
| 84 | 82 | | | | 12′ Agz. | botm. | 21 | S. 37° E. | 3.0 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 84 | | | | 12′ Agz. | botm. | 23 | S. 65° E. | 2.7 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 83 | | | | 12′ Agz. | botm. | 46 | S. 43° E. | 3.5 | |
| | | | | | K. 2 | 10 ft. | 46 | S. 43° E. | 3.5 | |
| 84 | 83 | | | | int. 4 § | 50 fms. | 20 | S. | .5 | |
| | | | | | | | 4 | | | |
| | | | | | K. 5 | surface. | 20 | S. | .5 | |
| | | | | | | | 4 | | | |
| | | 52.5 | | | Luc. sdr. (a) | | | | | |
| 83 | 84 | | | | 12′ Agz. | botm. | 12 | S. 28° E. | .9 | Whole apparatus carried away. |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 31 | S. 45° E. | 2.7 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 85 | | | | 12′ Agz. | botm. | 28 | S. 14° E. | 2.3 | |
| | | 52.1 | | | Luc. sdr. (a) | | | | | |
| 80 | 83 | | | | 12′ Agz. | botm. | 45 | N. 32° W. | 3.0 | |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | 12′ Agz. | botm. | 35 | N. 5° E. | 3.2 | |
| | | | | | K. 5 | surface. | 35 | N. 5° E. | 3.2 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 83 | | | | 12′ Agz. | botm. | 35 | S. 17° E. | 2.7 | |
| | | | | | K. 5 | 600 fms. | 33 | S. 17° E. | 2.0 | |
| | | | | | 25′ seine; dyn. | | 3 00 | | | Mouth of river. |
| | | | | | dyn. | 12–20 ft. | 10 00 | | | 21 shots. |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 80 | 83 | | | | 12′ Agz. | botm. | 16 | S. 52° E. | 2.5 | Lost apparatus and 1,000 fms. wire. |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 80 | 83 | | | | int. 4 § | 800 fms. | 20 | S. 60° E. | 2.6 | |
| | | | | | | | 35 | | | |
| 82 | 84 | | | | 12′ Agz. | botm. | 27 | S. 48° E. | 3.4 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 84 | | | | 12′ Agz. | botm. | 5 | N. 76° E. | 1.9 | Bridle stops lost frame twisted. |
| | | 53.5 | | | Luc. sdr. (a) | | | | | |
| 87 | 84 | | | | int. 4 § | 200 fms. | 18 | S. 67° E. | 1.0 | |
| | | | | | | | 13 | | | |
| | | | | | dyn. | 5 12 ft. | 4 30 | | | 20 shots. |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 86 | | | | 12′ Tnr. | botm. | 20 | S. 38° E. | 1.5 | |
| 84 | 86 | | | | 12′ Tnr. | botm. | 20 | S. 38° E. | 1.7 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Northern Mindanao and vicinity*—Continued. | | 1909. | | *fms.* | |
| D. 5503 | Macabalan Pt. Lt. (Mindanao), S. 31° E., 6.6 miles (8° 36′ 26″ N., 124° 36′ 08″ E.). | C. S. 4719; Aug., 1907. | Aug. 4... | 4.10 p. m.<br>4.38 p. m. | 226 | gn. M. |
| D. 5504 | Macabalan Pt. Lt. (Mindanao), S. 39° E., 6 miles (8° 35′ 30″ N., 124° 36′ E.). | .....do..... | Aug. 5... | 5.50 a. m.<br>6.15 a. m. | 200 | gn. M. |
| D. 5505 | Macabalan Pt. Lt. (Mindanao), S. 31° E., 7.7 miles (8° 37′ 15″ N., 124° 36′ E.). | .....do..... | ...do.... | 7.25 a. m. | *220 | |
| D. 5506 | Macabalan Pt. Lt. (Mindanao), S. 41° E., 12.2 miles (8° 40′ N., 124° 31′ 45″ E.). | .....do..... | ...do.... | 8.40 a. m.<br>9.12 a. m. | 262 | gn. M. |
| D. 5507 | Camp Overton Lt., Iligan Bay (Mindanao), S. 1° E., 8.6 miles (8° 21′ 12″ N., 124° 12′ 06″ E.). | C. S. 4613; June, 1906. | ...do.... | 1.09 p. m.<br>1.44 p. m. | 425 | gn. M., fne. S. |
| D. 5508 | Camp Overton Lt., Iligan Bay, S. 6° E., 4.9 miles (8° 17′ 24″ N., 124° 11′ 42″ E.). | .....do..... | ...do.... | 2.53 p. m.<br>3.17 p. m. | 270 | gn. M., fne. S. |
| ..... | Camp Overton, Iligan Bay (Mindanao). | .....do..... | Aug. 6... | 8.00 a. m. | ..... | Co., S. |
| ..... | Nonucan R., Iligan Bay (near Camp Overton). | .....do..... | ...do.... | 8.00 a. m. | ..... | |
| D. 5509 | Camp Overton Lt., S. 61° E., 5.7 miles (8° 15′ 24″ N., 124° 07′ 18″ E.). | .....do..... | Aug. 7... | 8.06 a. m.<br>8.36 a. m. | 377 | gy. M. |
| D. 5510 | Camp Overton Lt., S. 68° E., 9.1 miles (8° 16′ N., 124° 03′ 50″ E.). | .....do..... | ...do.... | 9.53 a. m.<br>10.31 a. m. | 423 | gy. M., fne. S. |
| D. 5511 | Camp Overton Lt., S. 80° E., 15.3 miles (8° 15′ 20″ N., 123° 57′ E.). | .....do..... | ...do.... | 11.46 a. m.<br>12.18 p. m. | 410 | gy. M., S. |
| D. 5512 | Camp Overton Lt., S. 76° E., 14 miles (8° 16′ 02″ N., 123° 58′ 26″ E.). | .....do..... | ...do.... | 1.09 p. m.<br>1.46 p. m. | 445 | gy. M., fne. S. |
| D 5513 | Camp Overton Lt., S. 67° E., 10.3 miles (8° 16′ 45″ N., 124° 02′ 48″ E.). | .....do..... | ...do.... | 3.07 p. m.<br>3.53 p. m. | 505 | gy. M., fne. S. |
| D. 5514 | Camp Overton Lt., S. 34° E., 24.3 miles (8° 32′ 42″ N., 123° 58′ 36″ E.). | .....do..... | Aug. 8... | 7.58 a. m.<br>8.50 a. m. | 697 | gn. M., S. |
| D. 5515 | Camp Overton Lt., S. 26° E., 24.6 miles (8° 34′ 48″ N., 124° 01′ 24″ E.). | .....do..... | ...do.... | 10.42 a. m. | ..... | |
| ..... | Inamucan Bay (Mindanao).. | .....do..... | ...do.... | 2.30 p. m. | ..... | R., Co. |
| ..... | .....do..... | .....do..... | Aug. 9... | 5.30 a. m. | ..... | S. |
| ..... | Murcielagos Bay (Mindanao). | C. S. 4641; Apr., 1902. | ...do.... | 9.30 a. m. | ..... | Co., S. |
| D. 5516 | Pt. Tagolo Lt. (Mindanao), S. 80° W., 9.7 miles (8° 46′ N., 123° 32′ 30″ E.). | C. S. 4723; Oct., 1905. | ...do.... | 9.57 a. m.<br>10.21 a. m. | 175 | Glob. |
| D. 5517 | Pt. Tagolo Lt., S. 83° W., 10.5 miles (8° 45′ 30″ N., 123° 33′ 45″ E.). | .....do..... | ...do.... | 11.00 a. m.<br>11.21 a. m. | 169 | Glob. |
| D. 5518 | Pt. Tagolo Lt., S. 64° W., 8.7 miles (8° 48′ N., 123° 31′ E.). | .....do..... | ...do.... | 12.36 p. m.<br>12.55 p. m. | 200 | gy. M., Glob. |
| D. 5519 | Pt. Tagolo Lt., S. 71° W., 8.7 miles (8° 47′ N., 123° 31′ 15″ E.). | .....do..... | ...do.... | 1.38 p. m.<br>1.56 p. m. | 182 | Glob., S. |
| D. 5520 | Pt. Tagolo Lt., N. 48° E., 4.5 miles (8° 41′ 15″ N., 123° 18′ 30″ E.). | .....do..... | Aug. 10.. | 6.02 a. m.<br>6.20 a. m. | 102 | |
| D. 5521 | Pt. Tagolo Lt., S. 11° E., 3 miles (8° 47′ N., 123° 22′ 30″ E.). | .....do..... | ...do.... | 7.24 a. m.<br>7.51 a. m. | 221 | fne. S. |
| ..... | Silino Id. (west)..... | .....do..... | ...do.... | 8.40 a. m. | ..... | S., Co. |
| D. 5522 | Pt. Tagolo Lt., S. 39° W., 6 miles (8° 49′ N., 123° 26′ 30″ E.). | .....do..... | ...do.... | 9.11 a. m.<br>9.57 a. m. | 230 | Glob. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 86 | | | | 12′ Tnr. | botm. | 20 | S. 2° E. | 1.2 | |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 77 | 83 | | | | 12′ Tnr. | botm. | 20 | N. 7° W. | 1.7 | |
| 79 | 83 | | | | 12′ Tnr. | botm. | 24 | N. 18° W. | 1.4 | |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 82 | | | | 12′ Tnr. | botm. | 14 | N. 24° W. | 1.7 | |
| | | 52.8 | | | Luc. sdr. (a) | | | | | |
| 85 | 84 | | | | 12′ Tnr. | botm. | 20 | S. 8° W. | 1.0 | |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 85 | | | | 12′ Tnr. | botm. | 24 | S. 2° E. | 1.8 | |
| | | | | | dyn. | 6–12 ft. | 8 00 | | | 10 shots. |
| | | | | | dyn. | | 8 30 | | 3.5 | |
| | | 53.0 | | | Luc. sdr. (a) | | | | | |
| 79 | 82 | | | | 12′ Tnr. | botm. | 23 | N. 34° W. | 1.4 | |
| | | 53.0 | | | Luc. sdr. (a) | | | | | |
| 83 | 84 | | | | 12′ Tnr. | botm. | 7 | S. 44° W. | 1.6 | Net badly torn. |
| | | 53.0 | | | Luc. sdr. (a) | | | | | |
| 84 | 85 | | | | 12′ Tnr. | botm. | 20 | N. 64° E. | 1.9 | |
| | | 52.8 | | | Luc. sdr. (a) | | | | | |
| 91 | 86 | | | | 12′ Tnr. | botm. | 20 | N. 74° E. | 2.2 | |
| | | 52.8 | | | Luc. sdr. (a) | | | | | |
| 84 | 85 | | | | 12′ Tnr. | botm. | 15 | S. 83° E. | 1.7 | Beam frame sprung; net torn. |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 81 | 83 | | | | 12′ Tnr. | botm. | 27 | N. 47° E. | 3.0 | Net fouled over beam. |
| 85 | 83 | | | | 12′ Tnr. | botm. | 28 | S. 20° W. | 1.6 | No sounding, depth about 700 fms. |
| | | | | | dyn. | 8–15 ft. | 3 00 | | | 11 shots. |
| | | | | | 430′ seine | 3 ft. | 2 00 | | | 3 hauls. |
| | | | | | dyn. | 6–25 ft. | 4 15 | | | 15 shots. |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 84 | | | | 12′ Tnr. | botm. | 20 | S. 63° E. | 1.2 | |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 85 | | | | 12′ Tnr. | botm. | 18 | S. 50° E. | 1.1 | |
| | | 54.0 | | | Luc. sdr. (a) | | | | | |
| 84 | 85 | | | | 12′ Tnr. | botm. | 21 | S. 9° E. | 1.2 | |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 85 | | | | 12′ Tnr. | botm. | 43 | S. 14° E. | 1.6 | |
| | | 61.3 | | | Luc. sdr. (a) | | | | | |
| 79 | 84 | | | | 12′ Tnr. | botm. | 24 | N. 13° E. | 1.3 | No bottom sample in sounding cup. |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 81 | 84 | | | | 12′ Tnr. | botm. | 4 | N. 52 E. | .9 | Whole apparatus carried away. |
| | | | | | dyn. | 10–20 ft. | 3 00 | | | 13 shots. |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 81 | 84 | | | | 12′ Tnr. | botm. | 18 | S. 79° E. | 1.2 | Net fouled over beam. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Northern Mindanao and vicinity*—Continued. | | 1909. | | *fms.* | |
| D. 5523 | Pt. Tagolo Lt., S. 48° W., 6.7 miles (8° 48′ 44″ N., 123° 27′ 35″ E.). | C. S. 4723; Oct., 1905. | Aug. 10 | 10.49 a. m. | | |
| D. 5524 | Pt. Tagolo Lt., S. 34° W., 17 miles (8° 58′ 07″ N., 123° 32′ 45″ E.). | ....do.... | ...do.... | 1.06 p. m.<br>1.51 p. m. | 360 | S. |
| | *Between Siquijor and Bohol Ids.* | | | | | |
| D. 5525 | Balicasag Id. (C.), N. 11° W., 18.2 miles (9° 12′ 30″ N., 123° 44′ 07″ E.). | C. S. 4718; Dec., 1906. | Aug. 11 | 8.28 a. m. | 405 | gy. M. |
| D. 5526 | Balicasag Id. (C.), N. 15° W., 18.4 miles (9° 12′ 45″ N., 123° 45′ 30″ E.) | ....do.... | ...do.... | 9.29 a. m.<br>10.36 a. m. | 805 | gn. M., Glob. |
| D. 5527 | Balicasag Id. (C.), N. 14° W., 8.2 miles (9° 22′ 30″ N., 123° 42′ 40″ E.) | ....do.... | ...do.... | 1.07 p. m.<br>1.38 p. m. | 392 | glob. Oz. |
| D. 5528 | Balicasag Id. (C.), N. 15° E., 5.8 miles (9° 24′ 45″ N., 123° 39′ 15″ E.) | ....do.... | ...do.... | 3.08 p. m.<br>3.42 p. m. | 439 | glob. Oz. |
| D. 5529 | Balicasag Id. (C.), N. 11° E., 6.9 miles (9° 23′ 45″ N., 123° 39′ 30″ E.). | ....do.... | ...do.... | 4.44 p. m.<br>5.19 p. m. | 441 | gy. M., Glob. |
| D. 5530 | Balicasag Id. (C.), N. 32° E., 4.3 miles (9° 26′ 45″ N., 123° 38′ 30″ E.). | ....do.... | ...do.... | 7.14 p. m. | | |
| D. 5531 | Balicasag Id. (C.), N. 43° E., 4.2 miles (9° 27′ 30″ N., 123° 38′ 00″ E.). | ....do.... | ...do.... | 7.49 p. m. | | |
| | *Between Masbate and Leyte.* | | | | | |
| D. 5532 | Gigantangan Id. (S.), S. 33° E., 3.8 miles (11° 36′ 39″ N., 124° 13′ 30″ E.). | C. S. 4718; Dec., 1906. | Aug. 13 | 7.14 p. m. | | |
| | *Between Cebu and Siquijor.* | | | | | |
| D. 5533 | Balicasag Id. (C.), N. 71° E., 9.4 miles (9° 27′ 15″ N., 123° 31′ 48″ E.). | C. S. 4718; Dec., 1906. | Aug. 19 | 5.30 a. m.<br>6.08 a. m. | 432 | gn. M., S. |
| D. 5534 | Balicasag Id. (C.), N. 72° E., 14.7 miles (9° 26′ 00″ N., 123° 26′ 37″ E.). | ....do.... | ...do.... | 8.23 a. m.<br>8.53 a. m. | 333 | gy. glob. Oz. |
| D. 5535 | Apo Id. (C.), S. 24° W., 17 miles (9° 20′ 30″ N., 123° 23′ 45″ E.). | ....do.... | ...do.... | 10.38 a. m.<br>11.07 a. m. | 310 | gy. glob. Oz. |
| | *Between Negros and Siquijor.* | | | | | |
| D. 5536 | Apo Id. (C.), S. 26° W., 11.8 miles (9° 15′ 45″ N., 123° 22′ 00″ E.). | C. S. 4718; Dec., 1906. | Aug. 19 | 12.50 p. m.<br>1.36 p. m. | 279 | gn. M. |
| D. 5537 | Apo Id. (C.), S. 46° W., 8.7 miles (9° 11′ 00″ N., 123° 23′ 00″ E.). | ....do.... | ...do.... | 3.15 p. m.<br>3.39 p. m. | 254 | gn. M. |
| D. 5538 | Apo Id. (C.), S. 64° W., 7.3 miles (9° 08′ 15″ N., 123° 23′ 20″ E.). | ....do.... | ...do.... | 4.55 p. m.<br>5.20 p. m. | 256 | gn. M., S. |
| D. 5539 | Apo Id. (C.), N. 78° W., 8.2 miles (9° 03′ 20″ N., 123° 24′ 45″ E.). | ....do.... | ...do.... | 7.11 p. m. | | |
| D. 5540 | Apo Id. (C.), N. 76° W., 8.1 miles (9° 03′ 00″ N., 123° 24′ 30″ E.). | ....do.... | ...do.... | 7.42 p. m. | | |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 82 | 84 | | | | 12′ Tnr.; m. b. | botm... | 20 | S. 22° E... | 1.2 | No sounding. |
| | | 52.8 | | | Luc. sdr. (a)... | | | | | |
| 83 | 84 | | | | 12′ Tnr..... | botm... | 22 | S. 16° W .. | 1.2 | |
| 82 | 82 | 53.3 | | | 12′ Tnr..... | botm... | 22 | N. 85° E .. | 1.7 | |
| 82 | 82 | 52.3 | | | Luc. sdr. (a)... | | | | | |
| 84 | 84 | | | | 12′ Tnr..... | botm... | 17 | E..... | 1.8 | |
| | | 53.3 | | | Luc. sdr. (a).. | | | | | |
| 87 | 84 | | | | 12′ Tnr..... | botm... | 20 | S. 14° E... | 1.2 | |
| | | 53.3 | | | Luc. sdr. (a)... | | | | | |
| 87 | 85 | | | | 12′ Tnr..... | botm... | 29 | S. 17° E... | 1.3 | |
| | | 53 | | | Luc. sdr. (a).. | | | | | |
| 85 | 85 | | | | 12′ Thr.; m. b.. | botm... | 35 | S. 17° E... | 1.6 | |
| 84 | 84 | | | | int. 4..... | surface. | 20 | | | |
| 83 | 84 | | | | int. 4..... | surface. | 28 | | | |
| 86 | 84 | | | | int. 4..... | surface. | 14 | | | |
| | | 53.3 | | | Luc. sdr. (a)... | | | | | |
| 80 | 81 | | | | 12′ Tnr..... | botm... | 23 | S. 30° E... | 1.3 | |
| | | 53.3 | | | Luc. sdr. (a)... | | | | | |
| 82 | 82 | | | | 12′ Tnr..... | botm... | 20 | S. 64° W .. | 1.8 | |
| | | 53.3 | | | Luc. sdr. (a)... | | | | | |
| 83 | 84 | | | | 12′ Tnr..... | botm... | 09 | S. 69° W .. | 1.5 | Bridle carried away at surface, causing loss of most of catch. |
| | | 53.5 | | | Luc. sdr. (a)... | | | | | |
| 84 | 85 | | | | 12′ Tnr..... | botm... | 20 | S. 60° W .. | 2.7 | |
| 87 | 84 | 53.5 | | | K. 5..... Luc. sdr. (a)... | | | | | |
| 85 | 84 | | | | 12′ Tnr..... | botm... | 20 | S. 75° W .. | 2.0 | |
| | | 53.3 | | | Luc. sdr. (a)... | | | | | |
| 83 | 83 | | | | 12′ Tnr..... | botm... | 22 | S. 80° W .. | 1.3 | |
| 83 | 83 | | | | int. 4..... | surface. | 19 | | .. | |
| 83 | 83 | | | | int. 4..... | surface. | 16 | | | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Northern Mindanao and vicinity.* | | 1909. | | *fms.* | |
| D. 5541 | Tagolo Lt., S. 65° W., 12.7 miles (8° 49′ 38″ N., 123° 34′ 30″ E.). | C. S. 4723; Oct., 1905. | Aug. 20 | 5.25 a. m.<br>5.51 a. m. | 219 | fne. S., brk. Sh. |
| D. 5542 | Tagolo Lt., S. 70° W., 13.2 miles (8° 48′ 30″ N., 123° 35′ 30″ E.). | do | do | 6.34 a. m.<br>6.56 a. m. | 200 | fne. S., brk. Sh. |
| D. 5543 | Tagolo Lt., S. 75° W., 12.5 miles (8° 47′ 15″ N., 123° 35′ 00″ E.). | do | do | 8.46 a. m.<br>9.04 a. m. | 162 | S. |
| | Murcielagos Bay (Mindanao). | C. S. 4641; Apr., 1902. | do | 1.00 p. m. | | S., Co. |
| | Cascade River, Murcielagos Bay. | do | do | 1.00 p. m. | | |
| D. 5544 | Coronado Pt., S. 37° W., 21.5 miles (8° 16′ 30″ N., 122° 26′ 30″ E.). | C. S. 4723 Oct., 1905. | Sept. 6 | 10.34 a. m.<br>11.17 a. m. | 759 | gn. M., fne. S. |
| | *East of Zamboanga.* | | | | | |
| | Tictauan Id., east | C. S. 4511; Dec., 1904. | Sept. 8 | 7.45 a. m. | | S., Co., R. |
| | Malanipa Id., northeast | do | do | 1.00 p. m. | | S., R., Co. |
| | Sacol Id., northeast | do | do | 7.00 p. m. | | |
| | | | Sept. 9 | 6.00 a. m. | | Co. |
| | Tulnalutan Id., north | do | do | 1.00 p. m. | | Co., S., R. |
| | *South of Zamboanga.* | | | | | |
| | Isabel Channel, Basilan Id. | C. S. 4543; May, 1907. | Sept. 11 | 8.30 a. m. | | S., Co. |
| | Lampinigan Id., north and east. | do | do | 1.30 p. m. | | Co., S. |
| | | | do | 7.30 p. m. | | |
| | Balukbaluk Id., west | C. S. 4511; Dec., 1904. | Sept. 12 | 8.30 a. m. | | Co., S. |
| | Pilas Id., northeast | do | do | 2.00 p. m. | | Co. |
| | Tapiantana Id., north | C. S. 4512; Sept., 1906. | Sept. 13 | 9.30 a. m. | | S., Co. |
| | Bulan Id., north | do | do | 3.00 p. m. | | Co. |
| | | do | do | 7.30 p. m. | | |
| | Tonquil Id., Gumila Reef | do | Sept. 14 | 8.30 a. m. | | Co., S. |
| | Tonquil Id., northwest | do | do | 2.00 p. m. | | Co., S. |
| | *Jolo I. and vicinity.* | | | | | |
| | Tulayan Id. | C. S. 4512; Sept., 1906 | Sept. 15 | 9.00 a. m. | | Co., S. |
| D. 5545 | Noble Pt., Tulayan Id. (E.), S. 19° W., 3 miles (6° 04′ 45″ N., 121° 20′ 20″ E.). | do | do | 9.26 a. m.<br>9.43 a. m. | 114 | fne. co. S. |
| D. 5546 | Noble Pt., Tulayan Id. (E.) S. 13° W., 5 miles (6° 06′ 48″ N., 121° 20′ 32″ E.). | do | do | 10.34 a. m.<br>10.52 a. m. | 138 | fne. co. S. |
| D. 5547 | Noble Pt., Tulayan Id. (E.), S. 38° E., 9.5 miles (6° 09′ 20″ N., 121° 13′ 40″ E.). | C. S. 4542; Apr., 1903. | do | 1.31 p. m.<br>1.51 p. m. | 155 | fne. S. |
| D. 5548 | Jolo Lt. (Jolo), N. 77° E., 14.9 miles (6° 00′ 20″ N., 120° 45′ 35″ E.). | do | Sept. 17 | 7.55 a. m.<br>8.20 a. m. | 232 | S., brk. Sh. |
| D. 5549 | Jolo Lt. (Jolo), N. 80° E., 15.8 miles (6° 01′ 15″ N., 120° 44′ 20″ E.). | do | do | 9.09 a. m.<br>9.36 a. m. | 263 | S., Glob., For. |
| D. 5550 | Jolo Lt. (Jolo), N. 83° E., 15.5 miles (6° 02′ 00″ N., 120° 44′ 40″ E.). | do | do | 10.20 a. m.<br>10.46 a. m. | 258 | fne. S., Sh. |
| | Sulade Id., north | do | do | 1.00 p. m. | | Co., S. |
| D. 5551 | Jolo Lt. (E.), N. 60° E., 18 miles (5° 54′ 48″ N., 120° 44′ 24″ E.). | do | do | 1.46 p. m.<br>2.07 p. m. | 193 | fne. S. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 81 | 83 | | | | 12′ Tnr | botm | 21 | S. 17° E | 1.0 | |
| | | 54.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 83 | | | | 12′ Tnr | botm | 20 | S. 25° W | 1.4 | Net came up torn and tangled. |
| | | 54.5 | | | Luc. sdr. (a) | | | | | |
| 86 | 84 | | | | 12′ Tnr | botm | 17 | S. 20° W | .7 | Bridle stops carried away, frame bent, net badly torn. |
| | | | | | dyn | 4–12 ft. | 8 00 | | | 22 shots. |
| | | | | | dyn | | 4 30 | | 1.5 | |
| | | 49.8 | | | Luc. sdr. (a) | | | | | |
| 82 | 83 | | | | int. 4 §. | 600 fms. | 20 33 | N. 49° W | 1.5 | |
| | | | | | dyn | 10–15 ft. | 3 30 | | | 12 shots. |
| | | | | | dyn | 10–18 ft. | 2 45 | | | 10 shots. |
| | | | | | dip; e. l. | | 1 00 | | | |
| | | | | | dyn | 12–15 ft. | 4 00 | | | Do. |
| | | | | | dyn | 9–20 ft. | 3 30 | | | 16 shots. |
| | | | | | dyn | 10–30 ft. | 2 30 | | | 6 shots. |
| | | | | | dyn | 6–18 ft. | 4 00 | | | 18 shots. |
| | | | | | dip; e. l. | | 1 15 | | | |
| | | | | | dyn | 8–18 ft. | 3 00 | | | 9 shots. |
| | | | | | dyn | 10–20 ft. | 3 30 | | | 10 shots. |
| | | | | | dyn | 8–10 ft. | 2 00 | | | 8 shots. |
| | | | | | dyn | 10–15 ft. | 2 30 | | | 12 shots. |
| | | | | | dip; e. l. | | 1 00 | | | |
| | | | | | dyn | 4–6 ft. | 3 00 | | | 14 shots. |
| | | | | | dyn | 8–10 ft. | 3 15 | | | 12 shots. |
| | | | | | dyn | 8–20 ft. | 3 00 | | | 7 shots. |
| | | | | | Luc. sdr. (e) | | | | | |
| 82 | 82 | | | | 9′ Tnr | botm | 16 | S. 34° E | 1.1 | |
| | | 58.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 82 | | | | 9′ Tnr | botm | 19 | S. 49° E | 1.4 | |
| | | 56.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 82 | | | | 9′ Tnr | botm | 20 | S. 32° E | 1.5 | |
| | | 53.5 | | | Luc. sdr. (a) | | | | | |
| 82 | 82 | | | | 9′ Tnr.; m. b | botm | 29 | N. 55° W | 1.5 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 83 | 83 | | | | 9′ Tnr.; m. b | botm | 21 | N. 23° E | 1.1 | |
| | | 52.3 | | | Luc. sdr. (a) | | | | | |
| 85 | 83 | | | | 9′ Tnr | botm | 28 | S. 60° E | 1.2 | |
| | | | | | dyn | 10–15 ft. | 4 00 | | | 14 shots. |
| | | 53.3 | | | Luc. sdr. (a) | | | | | |
| 84 | 83 | | | | 9′ Tnr | botm | 20 | S. 15° E | 1.1 | |

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | | | 1909. | | *fms.* | |
| | *Jolo I. and vicinity*—Cont'd. | | | | | |
| D. 5552 | Jolo Lt. (E.), N. 60° E., 18.3 miles (5° 54′ 30″ N., 120° 44′ 15″ E.). | C. S. 4542; Apr., 1903. | Sept. 17 | 3.18 p. m. | | |
| D. 5553 | Sulade Id. (NW.), S. 4° E., 0.5 mile (5° 51′ 00″ N., 120° 46′ 30″ E.). | do | do | 7.28 p. m. | | |
| D. 5554 | Cabalian Pt. (Jolo), N. 76° E., 3.8 miles (5° 52′ 27″ N., 120° 52′ 18″ E.). | do | Sept. 18. | 9.19 a. m.<br>9.29 a. m. | 25 | Co., S. |
| D. 5555 | Cabalian Pt. (Jolo), N. 50° W., 3.3 miles (5° 51′ 15″ N., 120° 58′ 35″ E.). | do | do | 10.59 a. m.<br>11.09 a. m. | 34 | crs. S. |
| D. 5556 | Cabalian Pt., N. 59° W., 4.5 miles (5° 50′ 55″ N., 121° 00′ 00″ E.). | do | do | 11.36 a. m. | 15 | |
| | Teomabal Id. (N.) | do | do | 1.30 p. m. | | setrd. Co., S. |
| D. 5557 | Cabalian Pt., N. 70° W., 5.2 miles (5° 51′ 30″ N., 121° 01′ 00″ E.). | do | do | 2.58 p. m. | 13 | S., Co.* |
| D. 5558 | Cabalian Pt., S., 1.1 miles (5° 51′ 33″ N., 121° 00′ 58″ E.). | do | do | 3.17 p. m. | 15 | Co.* |
| D. 5559 | Cabalian Pt., N. 66° W., 5.1 miles (5° 51′ 36″ N., 121° 00′ 45″ E.). | do | do | 3.35 p. m. | 13 | Co.* |
| D. 5560 | Cabalian Pt., N. 76° W., 5 miles (5° 52′ 00″ N., 121° 01′ 06″). | do | do | 4.04 p. m. | 14 | |
| D. 5561 | Teomabal Id. (NW.), S. 36° W., 0.2 mile (5° 50′ 45″ N., 121° 01′ 15″ E.). | do | do | 6.13 p. m. | *10 | |
| | Tutu Bay (Jolo) | do | Sept. 19. | 8.15 a. m.<br>1.45 p. m. | | Co., S.<br>Co., S. |
| D. 5562 | Tañun Pt. (Jolo), N. 87° E., 17.2 miles (5° 54′ 20″ N., 121° 13′ 12″ E.). | do | do | 6.07 p. m. | | |
| | *Between Jolo and Tawi Tawi.* | | | | | |
| | Siasi Id., north | C. S. 4544; Oct., 1906. | Sept. 20. | 10.30 a. m. | | Co., S. |
| | Tara Id., Panpan Pt. | do | do | 1.00 p. m. | | Co., S. |
| | Bolipongpong Id., south | C. S. 4722; Jan., 1909. | do | 3.30 p. m. | | S., Co., R |
| | Singaan Id., north | do | Sept. 21. | 10.00 a. m. | | Co |
| D. 5563 | Dammi Id. (N.), N. 79° W., 6.1 miles (5° 48′ 12″ N., 120° 30′ 48″ E.). | do | do | 10.25 a. m.<br>10.47 a. m. | 224 | fne. co. S |
| D. 5564 | Dammi Id. (N.), S. 85° W., 6.1 miles (5° 50′ 00″ N., 120° 31′ 00″ E.). | do | do | 11.24 a. m.<br>11.45 a. m. | 236 | fne. Co., S |
| D. 5565 | Dammi Id. (N.), S. 69° W., 6 miles (5° 51′ 42″ N., 120° 30′ 30″ E.). | do | do | 12.32 p. m.<br>1.00 p. m. | 243 | S., ptr. Sh |
| D. 5566 | Dammi Id. (N.), S. 67° W., 6.8 miles (5° 52′ 12″ N., 120° 31′ 00″ E.). | do | do | 1.42 p. m.<br>2.07 p. m. | 244 | fne. S., Sh. |
| | *North of Tawi Tawi.* | | | | | |
| D. 5567 | Dammi Id. (N.), N. 81° W., 9 miles (5° 48′ 00″ N., 120° 33′ 45″ E.). | C. S. 4722; Jan., 1909. | Sept. 21. | 3.36 p. m.<br>4.05 p. m. | 268 | fne. S. |
| D. 5568 | Singaan Id. (N.), West, 0.9 mile (5° 45′ 50″ N., 120° 26′ 00″ E.). | do | do | 6.35 p. m. | 13 | S., Co. |
| D. 5569 | Simaluc Id. (SE.), S. 8° W., 6.4 miles (5° 33′ 15″ N., 120° 15′ 30″ E.). | do | Sept. 22. | 8.19 a. m.<br>8.49 a. m. | 303 | co. S |
| D. 5570 | Simaluc Id. (SE.), S. 17° E., 5.7 miles (5° 32′ 15″ N., 120° 12′ 57″ E.). | do | do | 9.55 a. m.<br>10.27 a. m. | 330 | fne. S., Glob. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 83 | 83 | | | | 9′ Tnr.; m. b... | botm... | 21 | S. 23° E... | 1.5 | Depth about as previous station. |
| 82 | 83 | | | | int. 4..... | surface. | 10 41 | | | Ship at anchor. |
| | | | | | Tnr. sdr. (e)... | | | | | |
| 83 | 84 | | | | 6′ McC..... | botm... | 6 | N. 74° W... | .2 | Net torn. |
| | | | | | Tnr. sdr. (e)... | | | | | |
| 82 | 83 | | | | 6′ McC..... | botm... | 4 | N. 75° E... | .5 | |
| | | | | | hand lead... | | | | | |
| 82 | 83 | | | | 6′ McC..... | botm... | 3 | N. 68° E... | .3 | Trawl and 15 fms cable lost. |
| | | | | | dyn..... | 10–25 ft. | 3 30 | | | 7 shots. |
| | | | | | hand lead... | | | | | |
| 83 | 82 | | | | 6′ McC..... | botm... | 5 | S. W..... | .1 | |
| | | | | | hand lead... | | | | | |
| 83 | 82 | | | | 6′ McC..... | botm... | 3 | S. 44° W... | .4 | |
| | | | | | hand lead... | | | | | |
| 83 | 82 | | | | 6′ McC..... | botm... | 7 | S. W..... | .6 | |
| | | | | | hand lead... | | | | | |
| 83 | 82 | | | | 6′ McC..... | botm... | 9 | S. 20° E... | .5 | Everything carried away except bridle. |
| 81 | 82 | | | | int. 4..... | surface. | 11 47 | | | Ship at anchor. |
| | | | | | dyn..... | 10–20 ft. | 2 15 | | | 7 shots. |
| | | | | | dyn..... | 2–20 ft.. | 2 30 | | | 10 shots. |
| 84 | 82 | | | | int. 4..... | surface. | 11 41 | | | Ship at anchor. |
| | | | | | dyn..... | 15 ft ... | 1 30 | | | 5 shots. |
| | | | | | dyn..... | 8–15 ft.. | 1 30 | | | Do. |
| | | | | | dyn..... | 8–20 ft.. | 1 45 | | | Do. |
| | | | | | dyn..... | 9–25 ft.. | 8 00 | | | 17 shots. |
| | | 52.3 | | | Luc. sdr. (a)... | | | | | |
| 83 | 83 | | | | 9′ Tnr.; m. b... | botm... | 18 | N. 6° W... | 1.3 | |
| | | 52.3 | | | Luc. sdr. (a)... | | | | | |
| 84 | 83 | | | | 9′ Tnr..... | botm... | 28 | N. 9° E... | 1.5 | |
| | | 52.3 | | | Luc. sdr. (a)... | | | | | |
| 86 | 84 | | | | 9′ Tnr.; m. b.. | botm... | 21 | N. 45° E... | .7 | |
| | | 52.5 | | | Luc. sdr. (a)... | | | | | |
| 84 | 84 | | | | 9′ Tnr..... | botm... | 27 | N. 56° E... | 1.6 | |
| | | 52.0 | | | Luc. sdr. (a)... | | | | | |
| 85 | 83 | | | | 9′ Tnr.; m. b.. | botm... | 21 | N. 71° E... | 1.2 | |
| 82 | 83 | | | | int. 4..... | surface. | 11 20 | | | Ship at anchor. |
| | | 52.3 | | | Luc. sdr. (a)... | | | | | |
| 84 | 83 | | | | 9′ Tnr.; m. b.. | botm... | 10 | S. 73° E... | 1.0 | Net torn. |
| | | 52.3 | | | Luc. sdr. (a)... | | | | | |
| 87 | 83 | | | | 9′ Tnr.; m. b.. | botm... | 17 | N. 45° W.. | 1.0 | Net came up fouled on bolt head. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *North of Tawi Tawi*—Cont'd. | | 1909. | | *fms.* | |
| ..... | Simaluc Id., north..... | C. S. 4722; Jan., 1909. | Sept. 22. | 12.30 p. m. | ..... | S., Co..... |
| D. 5571 | Simaluc Id. (N.), S. 66° E., 5.8 miles (5° 30′ 45″ N., 120° 07′ 57″ E.). | .....do..... | ...do..... | 1.31 p. m.<br>2.00 p. m. | 340 | S., Sh..... |
| D. 5572 | Simaluc Id. (N.), S. 51° E., 4.7 miles (5° 31′ 26″ N., 120° 09′ 45″ E.). | .....do..... | ...do..... | 3.02 p. m.<br>3.34 p. m. | 334 | S..... |
| D. 5573 | Simaluc Id. (N.), S. 86° E., 0.4 mile (5° 28′ 30″ N., 120° 13′ 00″ E.). | .....do..... | ...do..... | 6.03 p. m. | 12 | ..... |
| D. 5574 | Simaluc Id. (N.), S. 66° E., 5.8 miles (5° 30′ 45″ N., 120° 07′ 57″ E.). | .....do..... | Sept. 23. | 7.20 a. m. | 340 | ..... |
| D. 5575 | Mt. Dromedario (Tawi Tawi), S. 16° W., 19.2 miles (5° 28′ 30″ N., 120° 02′ 27″ E.). | C. S. 4514; Jan., 1906 | ...do..... | 9.07 a. m.<br>9.43 a. m. | 315 | Co., S..... |
| D. 5576 | Mt. Dromedario, S. 22° W., 17.2 miles (5° 25′ 56″ N., 120° 03′ 39″ E.). | C. S. 4722; Jan., 1909. | ...do..... | 10.50 a. m.<br>11.22 a. m. | 277 | S..... |
| ..... | Bacun River (Tawi Tawi).... | C. S. 4514; Jan., 1906. | ...do..... | 1.30 p. m. | ..... | ..... |
| ..... | Simaluc Sibi Sibi Id ..... | ...do..... | ...do..... | 1.39 p. m. | ..... | Co., wh. S..... |
| D. 5577 | Mt. Dromedario, S. 9° W., 10.9 miles (5° 20′ 36″ N., 119° 58′ 51″ E.). | .....do..... | ...do..... | 2.38 p. m.<br>3.01 p. m. | 240 | crs. S..... |
| D. 5578 | Mt. Dromedario, S. 9° W., 4.8 miles (5° 14′ 38″ N., 119° 57′ 57″ E.). | .....do..... | ...do..... | 8.00 p. m. | 10 | ..... |
| | *Vicinity of Darvel Bay, Borneo.* | | | | | |
| ..... | Reef NW. of Tumindao Id .. | C. S. 4722; Jan., 1909. | Sept. 24. | 1.00 p. m. | ..... | Co., S..... |
| D. 5579 | Sibutu Id. peak, S. 77° E., 20.3 miles (4° 54′ 15″ N., 119° 09′ 52″ E.). | .....do..... | Sept. 25. | 8.03 a. m.<br>8.25 a. m. | 175 | fne. S., Co..... |
| D. 5580 | Sibutu Id. peak, S. 82° E., 23.2 miles (4° 52′ 45″ N., 119° 06′ 45″ E.). | .....do..... | ...do..... | 9.20 a. m.<br>9.40 a. m. | 162 | br. S., Co..... |
| ..... | Bumbum Id., north ..... | .....do..... | ...do..... | 2.30 p. m. | ..... | Co., S..... |
| D. 5581 | Bumbum Id. (NW.), S. 83° W., 3.5 miles (4° 30′ 25″ N., 118° 41′ 30″ E.). | H. O. 2117; June, 1903. | ...do..... | 5.55 p. m. | 21 | S., Co..... |
| D. 5582 | Si Amil Id. (N.), S. 82° W., 6.2 miles (4° 19′ 54″ N., 118° 58′ 38″ E.). | .....do..... | Sept. 26. | 10.11 a. m.<br>11.15 a. m. | 890 | gy. M., fne. S..... |
| ..... | Danawan Id..... | .....do..... | ...do..... | 2.00 p. m. | ..... | S., Co..... |
| | | | Sept. 27. | 8.15 a. m. | ..... | S., Co..... |
| | *Sibuko Bay, Borneo, and vicinity.* | | | | | |
| D. 5583 | Si Amil Id. (N.) N. 88 W, 3.2 mile (4° 19′ 00″ N., 118° 56′ 20″ E.). | H. O. 2117; June, 1903. | Sept. 27 | 1.48 p. m.<br>2.33 p. m. | 447 | fne. S..... |
| D. 5584 | Si Amil Id. (N.) N. 74° W., 5.4 miles (4° 17′ 40″ N., 118° 57′ 42″ E.). | .....do..... | ...do .... | 3.28 p. m.<br>4.02 p. m. | 292 | fn. S., gn. M..... |
| D. 5585 | Sipadan Id. (M.) S. 89° W., 12 miles (4° 07′ 00″ N., 118° 49′ 54″ E.). | .....do..... | Sept. 28 | 8.49 a. m.<br>9.31 a. m. | 476 | gy. M..... |
| D. 5586 | Sipadan Id. (M.) West, 9.4 miles (4° 06′ 50″ N., 118° 47′ 20″ E.). | .....do..... | ...do .... | 11.09 a. m.<br>11.44 a. m. | 347 | gy. M..... |
| ..... | Sipadan Id. (N.)..... | .....do..... | ...do .... | 2.00 p. m. | ..... | Co., S..... |
| D. 5587 | Sipadan Id. (W.) S. 12° E., 3.8 miles (4° 10′ 35″ N., 118° 37′ 12″ E.). | .....do..... | ...do.... | 2.35 p. m.<br>3.11 p. m. | 415 | gn. M., S., Co..... |
| D. 5588 | Mabul Id. (S.) N. 81° E., 1.7 miles (4° 14′ 20″ N., 118° 36′ 48″ E.). | .....do..... | ...do.... | 6.10 p. m. | 11 | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn. | 5–18 ft. | 4 00 | | | 11 shots. |
| | | 52.3 | | | Luc. sdr. (a). | | | | | |
| 81 | 84 | | | | 9′ Tnr.; m. b. | botm. | 21 | N. 67° E. | 1.4 | |
| | | 52.3 | | | Luc. sdr. (a). | | | | | |
| 82 | 84 | | | | 9′ Tnr.; m. b. | botm. | 26 | N. 82° E. | 1.9 | |
| 83 | 83 | | | | int. 4. | surface. | 11 42 | | | Ship at anchor. |
| 81 | 82 | | | | 9′ Tnr.; m. b. | botm. | 24 | N. 58° E. | 1.2 | |
| | | 52.3 | | | Luc. sdr. (a). | | | | | |
| 83 | 83 | | | | 9′ Tnr.; m. b. | botm. | 20 | S. 86° E. | 2.2 | |
| | | 53.3 | | | Luc. sdr. (a). | | | | | |
| 84 | 84 | | | | 9′ Tnr.; m. b. | botm. | 08 | S. 2° E. | 1.7 | |
| | | | | | dyn.; sml. seines. | | 3 30 | | | 4 shots. |
| | | | | | dyn. | 5–20 ft. | 3 30 | | | 8 shots. |
| | | 54.3 | | | Luc. sdr. (a). | | | | | |
| 79 | 82 | | | | 9′ Tnr.; m. b. | botm. | 18 | S. 61° E. | 1.8 | Mud bag lost. |
| 77 | 82 | | | | int. 4. | surface. | 9 49 | | | Ship at anchor. |
| | | | | | dyn. | 5–25 ft. | 4 00 | | | 17 shots. |
| | | 55.3 | | | Luc. sdr. (a). | | | | | |
| 80 | 82 | | | | 9′ Tnr.; m. b. | botm. | 20 | S. 37° W. | 1.5 | |
| | | 55.8 | | | Luc. sdr. (a). | | | | | |
| 82 | 83 | | | | 9′ Tnr.; m. b. | botm. | 17 | S. 16° W. | 1.0 | |
| | | | | | dyn. | 4–15 ft. | 3 00 | | | 13 shots. |
| 82 | 83 | | | | int. 4. | surface. | 11 55 | | | Ship at anchor. |
| | | 38.3 | | | Luc. sdr. (a). | | | | | |
| 81 | 82 | | | | 9′ Tnr.; m. b. | botm. | 17 | S. 17° E. | 3.3 | |
| | | | | | dyn. | 3–20 ft. | 3 30 | | | 13 shots. |
| | | | | | dyn. | 5–20 ft. | 8 30 | | | 27 shots. |
| | | 40.3 | | | Luc. sdr. (a). | | | | | |
| 84 | 85 | | | | 9′ Tnr.; m. b. | botm. | 28 | S. 46° E. | 2.0 | |
| | | 44.3 | | | Luc. sdr. (a). | | | | | |
| 80 | 84 | | | | 9′ Tnr.; m. b. | botm. | 21 | S. 56° W. | 1.3 | Net badly torn and Tanner beam lost. |
| | | 41.1 | | | Luc. sdr. (a). | | | | | |
| 84 | 82 | | | | 9′ Tnr; m. b. | botm. | 20 | S. 53° W. | 1.9 | |
| | | 44.0 | | | Luc. sdr. (a). | | | | | |
| 83 | 84 | | | | 9′ Tnr.; m. b. | botm. | 33 | N. 42° W. | .8 | |
| | | | | | dyn. | 8–20 ft. | 2 15 | | | 13 shots. |
| | | 42.3 | | | Luc. sdr. (a). | | | | | |
| 85 | 85 | | | | 9′ Tnr.; m. b. | botm. | 21 | S. 15° E. | 1.5 | |
| 83 | 82 | | | | int. 4. | surface. | 11 35 | | | Ship at anchor. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Sibuko Bay, Borneo, and vicinity*—Continued. | | 1909. | | *fms.* | |
| ..... | Mabul Id. (S) | H. O. 2117; June, 1903. | Sept. 29 | 7.00 a. m. | ..... | Co |
| D. 5589 | Mabul Id. (NW.) N. 3° W., 2.8 miles (4° 12′ 10″ N., 118° 38′ 08″ E.). | .....do..... | ...do.... | 7.16 a. m.<br>7.44 a. m. | 260 | fne. gy. S., gy. M. |
| D. 5590 | Mabul Id. (NW.) N. 22° W., 4.3 miles (4° 10′ 50″ N., 118° 39′ 35″ E.). | .....do..... | ...do.... | 8.33 a. m.<br>9.02 a. m. | 310 | gn. M., S. |
| D. 5591 | Mabul Id. (NW.) N. 6° W., 3.1 miles (4° 11′ 48″ N., 118° 38′ 20″ E.). | .....do..... | ...do.... | 10.54 a. m. | 260 | |
| D. 5592 | Silungan Id. (M.) N. 1° W., 6.4 miles (4° 12′ 44″ N., 118° 27′ 44″ E.). | .....do..... | ...do.... | 3.33 p. m.<br>4.00 p. m. | 305 | gn. M. |
| D. 5593 | Mt. Putri (sea tangent) Borneo, N. 52° W., 17.2 miles (4° 02′ 40″ N., 118° 11′ 20″ E.). | B. A. 2099; Apr., 1895. | ...do.... | 7.25 p. m.<br>7.34 p. m. | 38 | fne. S. |
| ..... | Tawao River | B. A. 2576; Oct., 1882, cor. to Aug., 1905. | Sept. 30 | 9.30 a. m. | ..... | M., S |
| D. 5594 | Mt. Putri (sea tangent) S. 82° E., 5.9 miles (4° 14′ 20″ N., 117° 53′ 12″ E.). | B. A. 2099; Apr., 1895. | ...do.... | 7.24 p. m. | 11 | |
| ..... | Silimpopon River | ..... | Oct. 2 | 8.00 a. m. | ..... | |
| | *Off Zamboanga, Mindanao, P. I.* | | | | | |
| D. 5595 | Zamboanga Lt. N. 31° W., 0.1 mile (6° 54′ 00″ N., 122° 04′ 30″ east). | C. S. 4645; July, 1907. | Oct. 6 | 7.13 p. m. | 9 | |
| D. 5596 | .....do..... | .....do..... | Oct. 10 | 6.00 p. m. | 9 | |
| D. 5597 | .....do..... | .....do..... | Oct. 12 | 11.45 a. m. | 9 | |
| D. 5598 | .....do..... | .....do..... | ...do.... | 3.10 p. m. | 9 | |
| D. 5599 | .....do..... | .....do..... | ...do.... | 6.20 p. m. | 9 | |
| | *North of Celebes.* | | | | | |
| D. 5600 | Menado (town) S. 58° E., 68 miles (2° 05′ 00″ N., 123° 52′ 30″ E.). | H. O. 1727; Apr., 1909. | Nov. 7 | 7.06 p. m. | ..... | |
| ..... | Talisse Id., east | B. A. 930; May, 1866. cor. to May, 1907. | Nov. 9 | 6.00 a. m. | ..... | Co |
| ..... | Limbe Strait, vicinity of Strait Id. | ..... | Nov. 10 | 4.30 p. m.<br>6.00 a. m.<br>1.00 p. m. | .....<br>.....<br>..... | Co<br>S., Co<br>S., Co |
| | *Gulf of Tomini, Celebes.* | | | | | |
| ..... | Kema (town) | B. A. 1727. | Nov. 13 | 8.45 a. m. | ..... | S |
| D. 5601 | Limbe Id. (NE.), N., 20.7 miles (1° 13′ 10″ N., 125° 17′ 05″ E.). | .....do..... | ...do.... | 1.15 p. m.<br>2.18 p. m. | 765 | S., Glob., Ptr |
| D. 5602 | Gorontalo pier, N., 7.1 miles (0° 22′ 00″ N., 132° 03′ 30″ E.). | B. A. 942*a*; Oct., 1868; cor. to Mar., 1906. | Nov. 14 | 9.01 a. m.<br>10.15 a. m. | 962 | gy. M. |
| D. 5603 | Gorontalo pier N. 6° W., 5.7 m. (00° 24′ 00″ N., 123° 03′ 45″ E.). | .....do..... | Nov. 15 | 1.12 p. m.<br>2.37 p. m. | 803 | S |
| D. 5604 | Bilatu (town), N. 26° W., 8.7 miles (0° 22′ 30″ N., 122° 42′ 30″ E.). | .....do..... | ...do.... | 7.25 p. m. | ..... | |
| ..... | Dodepo and Pasejogo Ids | B. A. 900; Mar., 1901; cor. to Mar., 1907. | Nov. 16 | 8.00 a. m. | ..... | Co |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | dyn. | 7–25 ft. | 5 00 | | | 15 shots. |
| | | 45.7 | | | Luc. sdr. (a). | | | | | |
| 81 | 82 | | | | 9′ Tnr.; m. b. | botm | 20 | S. 49° E. | 2.0 | |
| | | 44.3 | | | Luc. sdr. (a). | | | | | |
| 82 | 83 | | | | 9′ Tnr.; m. b. | botm | 21 | S. 55° E. | .21 | |
| 84 | 84 | | | | 9′ Tnr | botm | 21 | S. 58° E. | 1.8 | Depth estimated from dredging wire angle. |
| | | 43.3 | | | Luc. sdr. (a). | | | | | |
| 83 | 85 | | | | 9′ Tnr. | botm | 10 | N. 65° E. | .7 | |
| | | | | | Tnr. sdr. (a). | | | | | |
| 84 | 83 | | | | 9′ Tnr. | botm | 15 | West. | 1.4 | Frame badly bent. |
| | | | | | dyn. | | 8 30 | | | |
| 76 | 83 | | | | int. 4. | surface. | 1 37 | | | Ship at anchor. Net badly torn. |
| | | | | | dyn. | | 9 00 | | | |
| 80 | 80 | | | | int. 4. | surface. | 10 50 | | | Ship at anchor. |
| 80 | 81 | | | | int. 4. | do. | 12 30 | | | Do. |
| 83 | 82 | | | | int. 4. | do. | 2 20 | | | Do. |
| 85 | 82 | | | | int. 4. | do. | 3 00 | | | Do. |
| 84 | 82 | | | | int. 5. | do. | 11 15 | | | Do. |
| 80 | 82 | | | | int. 4. | surface. | 26 | | | No bearings obtainable. |
| | | | | | dyn. | 10–18 ft. | 5 30 | | | 16 shots. |
| | | | | | dyn. | 8–10 ft. | 1 30 | | | 2 shots. |
| | | | | | dyn. | 8–10 ft. | 4 30 | | | 11 shots. |
| | | | | | dyn. | 8–15 ft. | 4 00 | | | 12 shots. |
| | | | | | 380′ seine. | 7 ft | 2 00 | | | 2 hauls. |
| | | | | | Luc. sdr. (a). | | | | | |
| 81 | 83 | | | | 12′ Agz.; m. b. | botm | 21 | S. 29° E. | 1.8 | |
| | | | | | Luc. sdr. (a). | | | | | |
| 81 | 84 | | | | 12′ Agz. | botm | 20 | S. | 2.0 | Net torn; bridle ropes torn loose. |
| | | | | | Luc. sdr. (a). | | | | | |
| 84 | 84 | | | | 12′ Agz. | botm | 13 | E. | 1.0 | One bridle stop carried away. |
| 83 | 83 | | | | int. 4. | surface. | 25 | | | No bearings obtainable. |
| | | | | | dyn. | 8 20 ft. | 4 00 | | | 18 shots. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Gulf of Tomini, Celebes*—Con. | | 1909. | | *fms.* | |
| D. 5605 | Dodepo Id. (W.) N. 14° W., 5.9 miles (0° 21′ 33″ N. 121° 34′ 10″ E.). | B. A. 900; Mar., 1901; cor. to Mar., 1907. | Nov. 16 | 9.27 a. m.<br>10.25 a. m. | 647 | |
| ..... | Papajatu (Celebes) | ....do | ...do | 2.00 p. m. | ..... | M., Co |
| ..... | Sadaa Id., north | ....do | Nov. 17 | 6.00 a. m. | ..... | Co., R., S |
| D. 5606 | Dodepo Id. (W.) N. 3° W., 10.8 miles (0° 16′ 28″ N., 121° 33′ 30″ E.). | ....do | ...do | 9.09 a. m.<br>10.07 a. m. | 834 | gn. M |
| ..... | Binang Unang Id., east | B. A. 942*a*; Oct., 1868, cor. to Mar., 1906. | ...do | 4.00 p. m. | ..... | Co., S |
| D. 5607 | Binang Unang Id. (E.) S. 36° E., 5 miles (0° 04′ 00″ S., 121° 36′ 00″ E.). | ....do | Nov. 18 | 8.25 a. m.<br>9.20 a. m. | 761 | fne. S |
| D. 5608 | Binang Unang Id. peak, S. 87° E., 19 miles (0° 08′ 00″ S., 121° 19′ 00″ E.). | ....do | ...do | 12.48 p. m.<br>2.02 p. m. | 1,089 | gy. M |
| D. 5609 | Binang Unang Id. (N) N. 80° E., 21 miles (00° 11′ 00″ S., 121° 16′ 00″ E.). | ....do | ...do | 3.37 p. m.<br>4.51 p. m. | 1,092 | gn. M |
| ..... | Togian Bay, Togian Id | ....do | Nov. 19 | 7.45 a. m. | ..... | Co |
| D. 5610 | Batu Daka Id. (S.) N. 87° W., 20.9 miles (0° 36′ 00″ S., 122° 01′ 00″ E.). | ....do | ...do | 3.59 p. m.<br>4.50 p. m. | 678 | gy. M |
| D. 5611 | Buka Buka Id. (E.) S. 43° W., 6.4 miles (0° 40′ 30″ S., 121° 50′ 00″ E.). | ....do | ...do | 7.14 p. m. | ..... | |
| D. 5612 | Buka Buka Id. (E.) S. 3° E., 7 miles (0° 38′ 00″ S., 121° 45′ 40″ E.). | ....do | Nov. 20 | 6.04 a. m.<br>7.22 a. m. | 750 | |
| ..... | Buka Buka Id., north | ....do | ...do | 9.15 a. m. | ..... | Co |
| D. 5613 | Buka Buka Id. (E.) S. 28° 4 miles (0° 42′ 00″ S., 121° 44′ 00″ E.). | ....do | ...do | 10.16 a. m.<br>11.14 a. m. | 752 | gy. M |
| ..... | Malibagu Pt. (Celebes) | ....do | Nov. 21 | 10 00 a. m. | ..... | Co |
| | *Molucca Passage.* | | | | | |
| D. 5614 | Tifori Id. (C.) N. 19° E., 30.5 miles (0° 31′ 00″ N., 125° 58′ 45″ E.). | B. A. 942*a*: Oct., 1868, cor. to Mar., 1906. | Nov. 22 | 6.44 a. m.<br>7.58 a. m. | 1,100 | gy. M., S., Glob |
| D. 5615 | Tifore Id. (C.) N. 40° W., 35 miles (0° 32′ 30″ N., 126° 31′ 30″ E.). | ....do | ...do | 1.16 p. m.<br>2.37 p. m. | 1,021 | G |
| D. 5616 | Tifore Id. (C.) N. 62° W., 50 miles (0° 36′ 00″ N., 126° 52′ 20″ E.). | ....do | ...do | 6.44 p. m. | ..... | |
| | *Dodinga Bay, Gillolo Id.* | | | | | |
| ..... | Tidore Id., north | B. A. 942*a*: Oct., 1868, cor. to Mar., 1906. | Nov. 24 | 8.00 a. m. | ..... | Co |
| ..... | Maitara Id., north | ....do | Nov. 26 | 8.15 a. m. | ..... | Co |
| D. 5617 | Ternate Id. (SE.) S. 45° W., 7 miles (00° 49′ 30″ N., 127° 25′ 30″ E.). | ....do | Nov. 27 | 10.42 a. m.<br>11.01 a. m. | 131 | |
| H. 4934 | Ternate Id. (SE.) S. 33° W., 7.8 miles (0° 51′ 00″ N., 127° 25′ 10″ E.). | ....do | ...do | 11.37 a. m. | 139 | S., Lav |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 82 | 82 | | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 21 | S. 63° W.. | 1.7 | Net slightly torn. |
| | | | | | dyn..... | 15–20 ft. | 1 | | | 2 shots. |
| | | | | | dyn..... | 10–20 ft. | 1 | | | 10 shots. |
| 83 | 83 | | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 20 | S. 28° E... | 2.5 | |
| | | | | | dyn..... | 10–12 ft. | 2 | | | 11 shots. |
| 81 | 83 | | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 20 | S. 50° W.. | 1.5 | |
| 80 | 82 | 36.3 | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 20 | S. 40° W.. | 3.5 | |
| 83 | 83 | 36.3 | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 33 | S. 39° E... | 2.0 | |
| | | | | | dyn..... | 5–18 ft.. | 3 30 | | | Do. |
| 84 | 87 | | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 27 | N. 63° W.. | 2.0 | |
| 83 | 84 | | | | Int. 4..... | surface. | 20 | | | |
| 80 | 83 | | | | Luc. sdr. (a)..<br>12′ Agz..... | botm .. | 22 | S. 5° E.... | 1.5 | Therm., sounding cup, stray line and lead, and 70 fms. wire lost. |
| | | | | | dyb..... | 5–15 ft.. | 3 00 | | | 21 shots. |
| 85 | 84 | | | | Luc. sdr. (c)..<br>12′ Agz..... | botm .. | 19 | N. 20° E.. | 1.8 | |
| | | | | | dyn..... | 10–20 ft. | 1 30 | | | 7 shots. |
| 82 | 84 | | | | Luc. sdr. (c)..<br>12′ Agz..... | botm .. | 12 | N. W..... | 1.5 | Shot failed to detach.<br>Bridle stop carried away; net torn. |
| 84 | 84 | | | | Luc. sdr. (c)..<br>12′ Agz..... | botm .. | 20 | S. W..... | 1.5 | |
| 80 | 84 | | | | int. 4 §..... | 20–30 fms. | 18<br>2 | | | |
| | | | | | dyn..... | 6–18 ft.. | 4 00 | | | 8 shots. |
| | | | | | dyn..... | 8–18 ft.. | 3 45 | | | 13 shots. |
| 84 | 84 | | | | Luc. sdr. (c)..<br>12′ Agz..... | botm... | 10 | N. 71° W.. | 1.0 | |
| | | | | | Tnr. sdr. (e).. | | | | | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Molucca Passage.* | | 1909. | | *fms.* | |
| D. 5618 | Mareh Id., S. 69° E., 7.8 miles (0° 37′ 00″ N., 127° 15′ 00″ E.). | B. A. 942*a*; Oct., 1868, cor. to Mar., 1906. | Nov. 27 | 2.07 p. m.<br>2.44 p. m. | 417 | gy. M. |
| D. 5619 | Mareh Id. (S.) S. 78° E., 7 miles (0° 35′ 00″ N., 127° 14′ 40″ E.). | do | do | 3.36 p. m.<br>4.12 p. m. | 435 | fne. gy. S., M. |
| D. 5620 | Makyan Id. (S.), S. 44° E., 7 miles (0° 21′ 30″ N., 127° 16′ 45″ E.). | do | Nov. 28 | 5.48 a. m.<br>6.24 a. m. | 358 | gy. M. |
| | *Between Gillolo and Makyan islands.* | | | | | |
| | Makyan Id. (SE.) | B. A. 942*a*. Oct., 1868; cor. to Mar., 1906. | Nov. 28 | 8.30 a. m. | | S., Co |
| D. 5621 | Makyan Id. (S.), N. 54° W., 3 miles (0° 15′ 00″ N., 127° 24′ 35″ E.). | do | do | 9.21 a. m.<br>9.50 a. m. | 298 | gy. and bk. S. (m.b.) |
| | Powati Anchorage (Makyan). | B. A. 912, Mar., 1885; cor. to Oct., 1906. | Nov. 29 | 6.00 a. m. | | S., Co |
| D. 5622 | Makyan Id. (NE.), N. 66° W., 4.1 miles (0° 19′ 20″ N., 127° 28′ 30″ E.). | B. A. 942*a*, Oct., 1868; cor. to Mar., 1906. | do | 7.36 a. m.<br>8.03 a. m. | 275 | gy. M. |
| D. 5623 | Makyan Id. (S.), S. 88° W., 7.5 miles (0° 16′ 30″ N., 127° 30′ 00″ E.). | do | do | 8.56 a. m.<br>9.22 a. m. | 272 | fne. S., M. |
| D. 5624 | Makyan Id. (S.), N. 67° W., 8.9 miles (0° 12′ 15″ N., 127° 29′ 30″ E.). | do | do | 10.30 a. m.<br>10.58 a. m. | 288 | fne. S., M. |
| | *Between Gillolo and Kayoa islands.* | | | | | |
| | Kayoa Id. (northeast) | B. A. 942*a*, Oct., 1868; cor. to Mar., 1906. | Nov. 29 | 1.30 p. m. | | Co. |
| D. 5625 | Kayoa Id. (SE.), S. 3° W., 6 miles (0° 07′ 00″ N., 127° 28′ 00″ E.). | do | do | 1.49 p. m.<br>2.16 p. m. | 230 | gy. M., fne. S. |
| D. 5626 | Kayoa Id. (SE.), S. 5° W., 6.7 miles (0° 07′ 30″ N., 127° 29′ 00″ E.). | do | do | 3.09 p. m.<br>3.34 p. m. | 265 | gy. M., fne. S. |
| D. 5627 | Kayoa Id. (SE.), S. 15° E., 4.5 miles (0° 06′ 00″ N., 127° 26′ 00″ E.). | do | do | 6.02 p. m. | 22 | M. |
| | *Patiente Strait and southward.* | | | | | |
| D. 5628 | St. Lamo Id. (SE.), N. 9° W., 7 miles (0° 28′ 30″ S., 127° 45′ 00″ E.). | B. A. 942*a*, Oct., 1868; cor. to Nar., 1906. | Nov. 30 | 11.22 a. m.<br>12.45 p. m. | 1,291 | gy. M. |
| | Gane (Gillolo) | B. A. 912. Mar., 1885; cor. to Oct., 1906. | Dec. 1 | 8.00 a. m. | | mrgn. Co., S. |
| D. 5629 | Doworra Id. (S.), S. 62° W., 6 miles (0° 50′ 00″ S., 128° 12′ 00″ E.). | B. A. 942*a*, Oct., 1868; cor. to Mar., 1906. | Dec. 2 | 6.14 a. m.<br>6.43 a. m. | 205 | co. S |
| | Doworra Id. (south) | do | do | 8.00 a. m. | | Co. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | Luc. sdr. (c) | | | | | |
| 82 | 84 | | | | 12′ Agz. | botm. | 20 | S. 13° W. | 2.0 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 83 | 84 | | | | 12′ Agz. | botm. | 29 | S. 22° E. | 1.8 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 80 | 82 | | | | 12′ Agz. | botm. | 21 | South. | 1.0 | |
| | | | | | dyn. | 8–18 ft. | 3 00 | | | 17 shots. |
| | | | | | Luc. sdr. (c) | | | | | |
| 81 | 84 | | | | 12′ Agz.; m. b. | botm. | 20 | S. 28° E. | 1.2 | |
| | | | | | dyn. | 10–20 ft. | 1 00 | | | 4 shots. |
| | | | | | Luc. sdr. (c) | | | | | |
| 80 | 83 | | | | 12′ Agz.; m. b. | botm. | 21 | S. 10° E. | 1.0 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 81 | 83 | | | | 12′ Agz. | botm. | 20 | South. | 1.0 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 83 | 83 | | | | 12′ Agz. | botm. | 20 | S. 15° E. | 1.5 | |
| | | | | | dyn. | 8–30 ft. | 3 00 | | | 20 shots. |
| | | | | | Luc. sdr. (c) | | | | | |
| 83 | 84 | | | | 12′ Agz. | botm. | 21 | S. 5° W. | 1.8 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 84 | 84 | | | | 12′ Agz. | botm. | 18 | West. | 1.0 | |
| | | | | | hand lead | | | | | |
| 83 | 83 | | | | int. 4 | 5 fms. | 11 40 | | | Ship at anchor. |
| | | | | | Luc. sdr. (c) | | | | | Stray line carried away. |
| 86 | 84 | | | | 12′ Agz. | botm. | 20 | S. 20° E. | 2.5 | One bridle stop carried away. |
| | | | | | dyn. | 10–25 ft. | 7 00 | | | 24 shots. |
| | | | | | Luc. sdr. (c) | | | | | |
| 80 | 83 | | | | 12′ Agz. | botm. | 02 | | | Dredge frame runner badly bent; lead rope broken; bridle stops lost. |
| | | | | | dyn. | 10–20 ft. | 3 30 | | | 13 shots. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *South of Patiente Strait.* | | 1909. | | *fms.* | |
| D. 5630 | Doworra Id. (N.), N. 3° W., 4.5 miles (0° 56′ 30″ S., 128° 05′ 00″ E.). | B. A. 942*a*, Oct., 1868; cor. to Mar., 1906. | Dec. 2 | 8.51 a. m.<br>9.36 a. m. | 569 | co. S., M |
| D. 5631 | Doworra Id. (N.), N. 58° E., 10.5 miles (0°57′ 00″ S., 127° 56′ 00″ E.). | do | do | 1.11 p. m.<br>2.16 p. m. | 809 | gn. M. (in net) |
| D. 5632 | Selang Pt. (Bachian Id.), N. 56° W., 12.5 miles (1° 00′ 00″ S., 127° 50′ 00″ E.). | do | do | 4.12 p. m.<br>5.08 p. m. | 845 | |
| D. 5633 | Selang Pt., N. 24° W., 11.8 miles (1° 03′ 00″ S., 127° 44′ 00″ E.). | do | do | 7.14 p. m. | | |
| | *Pitt Passage.* | | | | | |
| D. 5634 | Gomomo Id. (E.), N. 41° E., 3 miles (1° 54′ 00″ S., 127° 36′ 00″ E.). | B. A. 942*a*, Oct., 1868; cor. to Mar., 1906. | Dec. 3 | 6.27 a. m.<br>7.02 a. m. | 329 | |
| | Gomomo Id. (S.) | do | do | 8.15 a. m. | | co. S |
| D. 5635 | Gomomo Id. (E.), N. 14° W., 2.5 miles (1° 53′ 30″ S., 127° 39′ 00″ E.). | do | do | 9.24 a. m.<br>9.56 a. m. | 400 | hrd<br>Co., R., soapstone. |
| D. 5636 | Gomomo Id (E.), N. 46° W., 6 miles (1° 55′ 00″ S., 127° 42′ 30″ E.). | do | do | 11.51 a. m.<br>1.18 p. m. | 1,262 | gy. M., fne. S |
| | *Bouro Id. (south) and vicinity.* | | | | | |
| | Uki Id | B. A. 942*a*; Oct., 1868, cor. to Mar., 1906. | Dec. 9 | 8.00 a. m. | | mrgn. Co |
| | Uki River | do | do | 8.00 a. m. | | |
| | Uki Id | do | do | 1.00 p. m. | | S., R |
| D. 5637 | Amblau Id. (N.), N. 80° E., 21 miles (3° 53′ 20″ S., 126° 48′ 00″ E.). | do | Dec. 10 | 7.06 a. m.<br>7.57 a. m. | 700 | gy. M |
| | Tifu Bay (Bouro Id.) | do | do | 1.00 p. m. | | S., M., R., Co |
| H. 4935 | Tifu Bay entrance (W.), N. 4° E., 2.2 miles (3° 46′ 15″ S., 126° 24′ 40″ E.). | do | do | 1.30 p. m. | 198 | |
| D. 5638 | Tifu Bay entrance (W.), N. 17° E., 3.2 miles (3° 47′ 15″ S., 126° 23′ 40″ E.). | do | do | 2.00 p. m.<br>2.36 p. m. | 517 | fne. gy. S |
| | Tomahu Id | do | Dec. 11 | 1.00 p. m.<br>7.00 p. m. | | Co., S |
| | *Molucca Sea.* | | | | | |
| D. 5639 | Cape Pamali (Wowoni Id.), (N.), S. 77° W., 27 miles (3° 54′ 50″ S., 123° 27′ 20″ E.). | B. A. 3616; May, 1907. | Dec. 13 | 5.23 a. m.<br>7.11 a. m. | 1,560 | gy. M |
| | *Buton Strait.* | | | | | |
| D. 5640 | Labuan Blanda Id., N. 88° E., 1 mile (4° 27′ 00″ S., 122° 55′ 40″ E.). | B. A. 3470; Apr., 1906. | Dec. 13 | 5.02 p. m.<br>5.10 p. m. | 24 | S., brk. Sh |
| | Labuan Blanda Id. (S.) | do | Dec. 14 | 6.00 a. m. | | mrgn. Co |
| D. 5641 | Kalono Pt. (W.), N. 61° W., 3.4 miles (4° 29′ 24″ S., 122° 52′ 30″ E.). | do | do | 9.30 a. m.<br>9.41 a. m. | 39 | S., Sh |
| D. 5642 | Tikola Peninsula (N.), N. 38° W., 6.5 miles (4° 31′ 40″ S., 122° 49′ 42″ E.). | do | do | 10.50 a. m.<br>11.00 a. m. | 37 | gy. M |
| | Great Tobea Id | do | do | 1.00 p. m. | | S., Co |
| | Pendek Id., north | do | Dec. 15 | 3.15 p. m. | | Co., S |
| D. 5643 | Pendek Id. (N.), S. 77° E., 1.7 miles (5° 11′ 45″ S., 122° 42′ 36″ E.). | do | do | 3.42 p. m.<br>4.06 p. m. | 215 | gn. M |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 82 | 84 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 24 | S. S. W. | 1.8 | |
| 84 | 86 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 20 | N. by W. | 1.5 | Sounding cup lost. |
| 83 | 85 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 22 | S. E. by E. | 2.0 | |
| 82 | 84 | | | | int. 4. | surface. | 19 | | | No bearings obtainable. |
| 81 | 84 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 13 | S.W. by S. | 1.0 | |
| | | | | | dyn. | 6–20 ft. | 7 30 | | | 23 shots. |
| 82 | 83 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 05 | S. S. E. | .5 | Bridle stops lost; frame bent. |
| 83 | 83 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 20 | S. by E. | 2.5 | |
| | | | | | dyn. | 10–30 ft. | 6 00 | | | 19 shots. |
| | | | | | dyn. | | 9 00 | | 7.0 | |
| | | | | | 75′ seine | 12 ft. | 3 30 | | | 9 hauls. |
| 79 | 83 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 12 | S. 21° W. | 1.3 | Net fouled on bottom. |
| | | | | | dyn.<br>Luc. sdr. (c) | 2–20 ft. | 3 15 | | | 18 shots. |
| 84 | 86 | | | | Luc. sdr. (c)<br>12′ Agz. | botm. | 20 | S. 78° E. | 1.0 | |
| | | | | | dyn.<br>dip; e. l. | 3–15 ft. | 4 30<br>1 30 | | | 13 shots. |
| 82 | 84 | | | | Luc. sdr. (c)<br>9′ Agz. rev. | botm. | 31 | N. 36° W. | .8 | |
| 84 | 84 | | | | Tnr. sdr. (e)<br>12′ Agz. | botm. | 12 | N. 52° W. | .3 | |
| | | | | | dyn.<br>Tnr. sdr. (e) | 5 ft. | 1 45 | | | 5 shots. |
| 83 | 84 | | | | 12′ Agz. | botm. | 17 | S. 81° W. | .6 | |
| 84 | 85 | | | | Tnr. sdr. (e)<br>12′ Agz. | botm. | 17 | N. 75° W. | 1.4 | |
| | | | | | dyn.<br>dyn.<br>Luc. sdr. (c) | 5–18 ft.<br>15–25 ft. | 3 30<br>1 45 | | | 11 shots.<br>12 shots. |
| 82 | 84 | | | | 12′ Agz. | botm. | 17 | S. 45° W. | .7 | |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Buton Strait*—Continued. | | 1909. | | *fms.* | |
| D. 5644 | Makasser Id. (E.), N. 4° E., 1.3 miles (5° 27′ 24″ S., 122° 38′ 00″ E.). | B. A. 3470; Apr.,1906. | Dec. 16 | 8.02 a. m. | 22 | |
| D. 5645 | North Id. (NE.), S. 10° W., 1.6 miles (5° 29′ 06″ S., 122° 36′ 06″ E.). | ....do.... | ...do... | 9.37 a. m.<br>9.54 a. m. | 206 | |
| D. 5646 | North Id. (S.), S. 68° E., 7.5 miles (5° 31′ 30″ S , 122° 22′ 40″ E.). | B. A. 3616; May, 1907. | ...do... | 11.36 a. m.<br>12 10 p. m. | 456 | gn. M. |
| D. 5647 | North Id. (S.), S. 87° E., 11.6 miles (5° 34′ 00″ S., 122° 18′ 15″ E.). | ....do.... | ...do... | 2.07 p. m.<br>2.44 p. m. | 519 | gn. M. |
| D. 5648 | North Id. (S.), N. 87° E., 10.2 miles (5° 35′ 00″ S., 122° 20′ 00″ E.). | ....do.... | ...do... | 3.47 p. m.<br>4.29 p. m. | 559 | gn. M. |
| D. 5649 | North Id. (S.), N. 87° E., 22 miles (5° 36′ 00″ S., 122° 07′ 36″ E.). | ....do.... | ...do... | 7.23 p. m. | | |
| | *Gulf of Boni.* | | | | | |
| ..... | Basa Id..... | B. A. 3616; May, 1907. | Dec. 17 | 8.00 a. m. | | Co<br>tide pools |
| D. 5650 | Lamulu Pt., N. 5° W., 12.5 miles (4° 53′ 45″ S., 121° 29′ 00″ E.). | ....do.... | ...do... | 8.34 a. m.<br>9.22 a. m. | 540 | gn. M. |
| D. 5651 | Buginkali Pt., S. 67° E., 21 miles (4° 43′ 50″ S., 121° 23′ 24″ E.). | ...do..... | ...do... | 1.39 p. m.<br>2.32 p. m. | 700 | gn. M. |
| D. 5652 | Lamulu, S. 36° E., 7.5 miles (4° 35′ 00″ S., 121° 23′ 06″ E.). | ....do.... | ...do... | 4.39 p. m.<br>5.24 p. m. | 525 | gn. M. |
| D. 5653 | Lamulu, S. 40° E., 18 miles (4° 27′ 36″ S., 121° 16′ 36″ E.). | ....do.... | ...do... | 7.23 p. m. | | |
| D. 5654 | C. Tabako, N. 17° E., 21.5 miles (3° 42′ 00″ S., 120° 45′ 50″ E.). | ....do.... | Dec. 18 | 5.41 a. m.<br>6.47 a. m. | 805 | |
| ..... | Labuandata Bay..... | ....do.... | ...do... | 9.00 a. m. | | Co., S. |
| D. 5655 | C. Tabako, N. 7° E., 13 miles (3° 34′ 10″ S., 120° 50′ 30″ E.). | ....do.... | ...do... | 10.20 a. m.<br>11.00 a. m. | 608 | gy. M., fne. S |
| H. 4936 | C. Tabako, N. 47° E., 9 miles (3° 28′ 00″ S., 120° 45′ 40″ E.). | ....do.... | ...do... | 1.40 p. m. | 667 | gy. M. |
| D. 5656 | Olang Pt., N. 67° W., 14.5 miles (3° 17′ 40″ S., 120° 36′ 45″ E.). | ....do.... | Dec. 19 | 7.36 a. m.<br>8.37 a. m. | 484 | gy. M. |
| D. 5657 | Olang Pt., N. 61° W., 15.5 miles (3° 19′ 40″ S., 120° 36′ 30″ E.). | ....do.... | ...do... | 10.29 a. m.<br>11.08 a. m. | 492 | gy. M. |
| D. 5658 | C. Loko Loko, S. 31° W. ,12 miles (3° 32′ 40″ S., 120° 31′ 30″ E.). | ....do.... | ...do... | 1.38 p. m.<br>2.23 p. m. | 510 | gy. M. |
| D. 5659 | C. Lassa, S. 78° W., 19 miles (5° 33′ 20″ S., 120° 47′ 10″ E.). | ....do.... | Dec. 20 | 6.10 a. m.<br>6.57 a. m. | 702 | S. M. |
| | *Flores Sea.* | | | | | |
| H. 4937 | C. Lassa, S. 78° W., 20.5 miles (5° 32′ 50″ S., 120° 49′ 10″ E.). | B. A. 3616; May, 1907. | Dec. 20 | 8.12 a. m. | 885 | gy. M. |
| D. 5660 | C. Lassa, S. 88° W., 20.5 miles (5° 36′ 30″ S., 120° 49′ 00″ E.). | ....do.... | ...do... | 9.14 a. m.<br>10.05 a. m. | 692 | gy. M., S. |
| D. 5661 | C. Lassa, N. 21° E., 12.5 miles (5° 49′ 40″ S., 120° 24′ 30″ E.). | ....do.... | ...do... | 4.05 p. m.<br>4.24 p. m. | 180 | hrd. |
| D. 5662 | Tana Keke Id. (W.), N. 17° W., 12.5 miles (5° 43′ 00″ S., 119° 18′ 00″ E.). | B. A. 2637, June, 1885; cor. to Oct., 1904. | Dec. 21 | 5.40 a. m.<br>6.12 a. m. | 211 | |
| ..... | Tana Keke Id. (S.)..... | ....do.... | ...do... | 8.30 a. m. | | Co. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| | | | | | hand lead | | | | | |
| 80 | 83 | | | | 12′ Agz. | botm. | 11 | S. 81° W. | .4 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 79 | 83 | | | | 12′ Agz. | botm. | 01 | N. 34° W. | .7 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 79 | 83 | | | | 12′ Agz. | botm. | 20 | East | 1.1 | |
| | | | | | Luc. sdr. (c) | | | | | |
| 83 | 83 | | | | 12′ Agz. | botm. | 20 | S. 40° E. | 1.0 | |
| | | 39.2 | | | Luc. sdr. (c) | | | | | |
| 83 | 83 | | | | 12′ Agz. | botm. | 23 | S. 55° E. | .8 | |
| 83 | 83 | | | | int. 4 | surface. | 21 | | | No bearings obtainable. |
| | | | | | dyn. | 12–20 ft. | 3 00 | | | 10 shots. |
| | | | | | copper sulphate | | 3 00 | | | |
| | | 40.1 | | | Luc. sdr. (c) | | | | | |
| 84 | 84 | | | | 12′ Agz. | botm. | 10 | S. 45° W. | .7 | Bridle stops carried away. |
| | | 38.7 | | | Luc. sdr. (c) | | | | | Sounding cup carried away. |
| 85 | 84 | | | | 12′ Agz. | botm. | 20 | N. 11° W. | 2.9 | |
| | | 41.2 | | | Luc. sdr. (c) | | | | | |
| 84 | 84 | | | | 12′ Agz. | botm. | 20 | N. 61° W. | 2.1 | |
| 82 | 82 | | | | int. 4 | surface. | 20 | | | No bearings obtainable. |
| | | 38.3 | | | Luc. sdr. (c) | | | | | |
| 79 | 83 | | | | 12′ Agz. | botm. | 28 | N. 1° W. | 2.0 | |
| | | | | | dyn. | 5–18 ft. | 3 00 | | | 12 shots. |
| | | 39.2 | | | Luc. sdr. (c) | | | | | |
| 84 | 84 | | | | 12′ Agz. | botm. | 20 | S. 45° E. | 1.5 | |
| | | | | | Luc. sdr. (c) | | | | | Therm. failed to register. |
| | | 41.2 | | | Luc. sdr. (c) | | | | | |
| 80 | 83 | | | | 12′ Agz. | botm. | 05 | S. 41° W. | 1.8 | |
| | | 41.3 | | | Luc. sdr. (c) | | | | | |
| 82 | 84 | | | | 12′ Agz. | botm. | 20 | S. 19° W. | 2.0 | |
| | | 41.2 | | | Luc. sdr. (c) | | | | | |
| 83 | 85 | | | | 12′ Agz. | botm. | 20 | S. 35° E. | 1.2 | |
| | | 39.0 | | | Luc. sdr. (c) | | | | | |
| 83 | 82 | | | | 12′ Agz. | botm. | 21 | S. 62° E. | 1.0 | |
| | | 38.2 | | | Luc. sdr. (c) | | | | | |
| | | 39.2 | | | Luc. sdr. (c) | | | | | |
| 83 | 83 | | | | 12′ Agz. | botm. | 20 | S. 58° E. | 1.8 | |
| | | 50.5 | | | Luc. sdr. (c) | | | | | |
| 86 | 83 | | | | 12′ Agz. | botm. | 03 | N. 50° E. | 1.1 | Net torn below lead line. |
| | | 48.8 | | | Luc. sdr. (c) | | | | | |
| 82 | 83 | | | | 12′ Agz. | botm. | 20 | West | 1.8 | No bottom specimen. |
| | | | | | dyn. | 9–18 ft. | 2 45 | | | 16 shots. |

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Macassar Strait.* | | 1909. | | *fms.* | |
| D 5663 | Kapoposang Id. (E.), N. 11° E., 1.7 miles (4° 43′ 22″ S., 118° 57′ 35″ E.). | Dutch 123; Sept., 1901. | Dec. 27 | 7.20 p. m. | 10 | |
| D. 5664 | Kapoposang Lt., N. 66° E., 3.8 miles (4° 43′ 22″ S., 118° 53′ 18″ E.). | .....do..... | Dec. 28 | 9.09 a. m.<br>9.43 a. m. | 400 | hrd |
| D. 5665 | Kapoposang Lt., S. 40° E., 18.8 miles (4° 27′ 00″ S., 118° 44′ 00″ E.). | B. A. 2637; June, 1885, cor. to Oct., 1904. | ...do.... | 1.51 p. m.<br>2.59 p. m. | 1,008 | M |
| ..... | Libani Bay, Celebes (W.)... | .....do..... | Dec. 29 | 8.00 a. m. | ..... | Co |
| D. 5666 | Onkona Pt., S. 1° W., 11 miles (2° 54′ 30″ S., 118° 47′ 00″ E.). | .....do..... | ...do.... | 8.39 a. m.<br>9.18 a. m. | 272 | gn. M |
| D. 5667 | Onkona Pt., S. 5° W., 11 miles (2° 56′ 00″ S., 118° 47′ 30″ E.). | .....do..... | ...do.... | 9.55 a. m.<br>10.25 a. m. | 367 | gy. S., M |
| D. 5668 | Mamuju Id. (E.), S. 31° E., 10.6 miles (2° 28′ 15″ S., 118° 49′ 00″ E.). | .....do..... | ...do.... | 3.41 p. m.<br>4.45 p. m. | 901 | gy. M |
| D. 5669 | Mamuju Id. (E.), S. 14° E., 18.5 miles (2° 19′ 30″ S., 118° 50′ 00″ E.). | .....do..... | ...do.... | 7.25 p. m. | ..... | |
| D. 5670 | Chenoki Pt., S. 60° E., 40 miles (1° 19′ 00″ S., 118° 43′ 00″ E.). | B. A. 941*b*, Nov., 1867; cor. to Aug., 1907. | Dec. 30 | 7.03 a. m.<br>8.18 a. m. | 1,181 | gy. M |
| D. 5671 | Chenoki Pt., S. 31° E., 42.5 miles (1° 05′ 00″ S., 118° 56′ 00″ E.). | .....do..... | ...do.... | 12.41 p. m.<br>1.45 p. m. | 960 | gy. M |
| D. 5672 | Dongala Lt., S. 80° E., 54 miles (0° 29′ 00″ S., 118° 51′ 00″ E.). | B. A. 2636; Apr., 1878. cor. to Apr., 1907. | ..do.... | 7.26 p. m. | ..... | |
| ..... | Birabirahan (west)..... | B. A. 941*b*; Nov., 1867, cor. to Aug., 1907. | Dec. 31 | 8.45 a. m. | ..... | Co |
| | *Trusan Tando Bulong, B. N. Borneo.* | | 1910. | | | |
| ..... | Daisy Islet, 4° 27′ 53″ N., 118° 38′ 25″ E. | H. O. 2117; June, 1903. | Jan. 6 | 1.45 p. m. | ..... | Co |
| | *Sulu Sea.* | | | | | |
| ..... | Doc Can Id., southwest..... | C. S. 4722... | Jan. 7 | 10.15 a. m. | ..... | S., Co |
| | *China Sea.* | | | | | |
| ..... | Kwa Siang Bay, Formosa... | ..... | Jan. 25 | 8.30 a. m. | ..... | ..... |
| ..... | So Wan Bay, Formosa..... | ..... | Jan. 29 | 7.30 a. m. | ..... | ..... |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 83 | 84 | | | | hand line | | | | | |
| | | | | | int. 4 | surface. | 10 40 | | | Ship at anchor. |
| | | 43.3 | | | Luc. sdr. (c) | | | | | |
| 81 | 84 | | | | 12′ Agz | botm | 21 | S. 67° W | 2.5 | No bottom sample in net. |
| | | | | | Luc. sdr. (c) | | | | | No bearings obtainable. |
| 80 | 82 | | | | 12′ Agz | botm | 05 | SW | 2.0 | Entire net carried away on bottom |
| | | | | | dyn | 6–18 ft. | 3 30 | | | 20 shots. |
| | | 47.5 | | | Luc. sdr. (c) | | | | | |
| 80 | 82 | | | | 12′ Agz | botm | 12 | S. 34° E | 1.5 | |
| | | 41.7 | | | Luc. sdr. (c) | | | | | |
| 82 | 83 | | | | 12′ Agz | botm | 20 | N. 34° W | 1.5 | |
| | | 38.2 | | | Luc. sdr. (c) | | | | | |
| 81 | 83 | | | | 12′ Agz | botm | 19 | S. 47° E | 2.8 | Shot did not detach. |
| 83 | 84 | | | | int. 4 | surface. | 24 | North | 1.0 | |
| | | 38.2 | | | Luc. sdr. (c) | | | | | Shot did not detach. |
| 82 | 82 | | | | 12′ Agz | botm | 20 | South | 2.0 | One bridle stop parted. |
| | | 38.2 | | | Luc. sdr. (c) | | | | | |
| 83 | 84 | | | | 12′ Agz | botm | 23 | S. 63° E | 2.0 | |
| 82 | 83 | | | | int. 4 | surface. | 20 | N. 10° W | | No bearings obtainable. |
| | | | | | dyn | 10–20 ft. | 2 15 | | | 12 shots. |
| | | | | | dyn | 10–15 ft. | 45 | | | 6 shots. |
| | | | | | dyn | 10–30 ft. | 1 00 | | | 10 shots. |
| | | | | | dyn | 10–25 ft. | 3 00 | | | 13 shots. |
| | | | | | dyn | 10–30 ft. | 3 30 | | | 27 shots. |

# CONDITION AND EXTENT OF THE NATURAL OYSTER BEDS OF DELAWARE

By H. F. Moore

*Assistant, U. S. Bureau of Fisheries*

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Bureau of Fisheries Document No. 745

# CONTENTS.


| | Page. |
|---|---|
| Introduction | 3 |
| Methods of the survey | 4 |
| Description of oyster grounds | 7 |
| Bombay bed | 7 |
| Thrum-cap bed | 8 |
| Over-the-Bar bed | 9 |
| Patches between Over-the-Bar and Sand beds | 10 |
| Sand bed | 11 |
| Leipsic Rock | 11 |
| Bed north of Silver bed | 12 |
| Between Silver bed and Simons Creek | 12 |
| Silver bed | 13 |
| Lumps between Silver and Ridge beds | 14 |
| Drum bed | 15 |
| Ridge bed | 16 |
| Small beds northeast of Ridge bed | 18 |
| Old bed | 19 |
| Outside of Old bed | 19 |
| Scattered patches between Ridge and Southwest beds | 20 |
| Southwest bed | 20 |
| Stone bed | 22 |
| East Line bed | 22 |
| Flogger bed | 23 |
| The beds in summary | 23 |
| Physical and biological conditions | 27 |
| Tides and currents | 27 |
| Salinity of the water | 27 |
| Enemies of the oyster | 28 |

# CONDITION AND EXTENT OF THE NATURAL OYSTER BEDS OF DELAWARE.

By H. F. Moore,
*Assistant, United States Bureau of Fisheries.*

## INTRODUCTION.

At the solicitation of the Delaware Oyster Survey Commission the Bureau of Fisheries during the summer of 1910 undertook a survey of the natural oyster beds of Delaware Bay within the jurisdiction of the State of Delaware. The State, which was making a survey of the planted beds under the supervision of Mr. C. C. Yates, of the United States Coast and Geodetic Survey, furnished the triangulation and made a small appropriation for the payment of two temporary employees during part of the work, but the Bureau of Fisheries furnished all other personnel, in addition to launches, boats, and equipment.

The steamer *Fish Hawk* was detailed for the work from June 1 to July 10, though, owing to unexpected delays in securing a launch able enough for the execution of hydrography in the open waters of the bay, she did not actually reach the field of operations until June 18. Part of the civilian personnel was ordered to the ship on May 26, in order to have the equipment in readiness for the anticipated commencement of work on June 1, on which date the entire party was assembled.

The purpose of the survey was the accurate location and charting of the natural oyster beds and the investigation of their present condition and productiveness. No previous survey or investigation of the beds of this region has been made, and although their approximate location is known to the local oystermen with reference to certain more or less indefinable natural landmarks, it is difficult for them to indicate, even roughly, their general position on the charts. Concerning some of the beds, and especially the southern extension of Flogger bed, the information obtained from the various sources was extremely contradictory.

## METHODS OF THE SURVEY.

The methods employed were those pursued in former surveys of like character, and are explained in detail in a description of the beds of the James River,[1] from which some of the following is repeated:

A "boat sheet" was prepared, on which were accurately platted the positions, as determined by triangulation, of lighthouses and the towers erected as shore signals. These data were furnished by the State and were based on a development of the triangulation employed in the survey of the planted or leased beds.

The oyster beds were discovered by soundings with a lead line, but principally by means of a length of chain dragged over the bottom at the end of a copper wire running from the sounding boat. The wire was wound on a reel and its unwound length was adjusted to the depth of water and the speed of the launch, so that the chain was always on the bottom. Whenever the chain touched a shell or an oyster the shock or vibration was transmitted up the wire to the hand of a man whose sole duty it was to give heed to such signals and report them to the recorder.

The launches from which the soundings were made were run at a speed of between 3 and 4 miles per hour, usually on ranges ashore to insure the rectitude of the lines. At intervals of three minutes—in some cases two minutes—the position of the boat was determined by two simultaneous sextant observations of the angles between a set of three signals, the middle one of which was common to the two angles, the position being immediately platted on the boat sheet. At regular intervals of twenty seconds, as measured by a clock under the observation of the recorder, the leadsman made a sounding and reported to the recorder the depth of water and the character of the bottom, immediately after which the man at the wire reported the character of the chain indications since the last sounding—that is, whether they showed barren bottom or dense, scattering, or very scattering growths of oysters.

With the boat running at 3 miles per hour the soundings were between 80 and 90 feet apart, and, as the speed of the boat was uniform, the location of each was determinable within a yard or two by dividing the platted distance between the positions determined by the sextant by the number of soundings. The chain, of course, gave a continuous indication of the character of the bottom, but the record was made at the regular twenty-second intervals observed in sounding.

The chain, while indicating the absence or the relative abundance of objects on the bottom, gives no information as to whether they are shells or oysters, nor, if the latter, their size and condition. To obtain these data it was necessary to supplement the observations

[1] Moore, H. F.: Condition and extent of the oyster beds of James River, Virginia. Bureau of Fisheries Document No. 729.

already described by others more definite in respect to the desired particulars. Whenever, in the opinion of the officer in charge of the sounding boat, such information was required, a numbered buoy was dropped, the time and number being entered in the sounding book. Another launch, following the sounding boat, anchored alongside the buoy, and a quantity of the oysters and shells were tonged up, separated by sizes, and counted.

This boat at each station made a known number of "grabs" with the oyster tongs, exercising care to clean the bottom of oysters as thoroughly as possible at each grab. In a given depth of water and using the same boat and tongs, an oysterman will cover practically the same area of the bottom at each grab, but, other factors remaining the same, the area of the grab will decrease with an increase in the depth.

Careful measurements were made and tabulated showing the area per grab covered by the tonger employed on the work at each foot of depth of water and for each pair of tongs and boat used. With these data, and knowing the number of "grabs," the number of oysters of each size per square yard of bottom was readily obtainable by simple calculation. The following example will illustrate the data obtained and the form of the record:

DEPARTMENT OF COMMERCE AND LABOR.

BUREAU OF FISHERIES.

FIELD RECORD OF EXAMINATIONS OF OYSTER BEDS.

General locality, *Delaware Bay, Delaware.*
Local name of oyster ground, *Over-the-Bar.*
Date, *July 9, 1910.* Time, *8.50 a. m.*
Angle, *B 146–B 147.* Buoy *No. 6.*
Depth, *18 feet.* Bottom, *soft.*
Condition of water, *clear.*
Density, *1.008.* Temperature, *25° C.*
Current, ..... Stage of tide, *one hour flood.*
Tongman, *M. A. Duffield.*
No grabs made, *8.* Tongs, *20 feet.*
Total area covered, *2.5* sq. yds.
No oysters taken { *1 in., 13. 1 in.–3 in., 129.* / *3 in.–4 in., 59. 4 in., 11.*
Quantity shells, *14.*
Result { Spat per square yard, *5.2.* / Culls per square yard, *51.6.* / Counts per square yard, *28.0.*

This furnishes an exact statement of the condition of the bed at a spot which can be platted on the chart with error in position of not more than a few yards. From the data obtained a close estimate may be formed of the number of bushels of oysters and shells per acre in the vicinity of the examination and, by multiplying the observations, for the bed as a whole. In the course of the survey 590 observations were made at various places, principally on the natural rocks, but some on the barren bottoms also.

In estimating the relative productiveness of the bottoms it appeared advisable to depart from the methods employed in the James River survey on account of the difference in the conditions under which the industry is prosecuted. Where tongs are used exclusively, a bed with a given quantity of oysters lying in shoal water is more valuable, commercially, than one with the same quantity of oysters in deep water, owing to the fact that the labor of the tonger is more efficient on the former. As has been pointed out, the area covered by a "grab" decreases with the depth, other factors being the same, and moreover the deeper the water the greater is the labor involved in making the grab and the smaller is the number of grabs which can be made in a given time.

In Delaware Bay, while there is a certain amount of tonging during the fall and at such times as the weather will permit in winter and early spring, the most important and productive fishing is by means of dredges, the use of which is permitted from April 15 to June 30, inclusive. In dredging, the effects of varying depths of water, within reasonable limits, are practically negligible so far as the catch is concerned. The time required for winding in from deep water is greater than from shallow water, but as the dredge is approximately equally efficient whatever the depth, and as the difference in the time required in winding is small as compared with the period during which the dredge is on the bottom, the factor of depth, so important in tonging, is practically inconsiderable.

The classification adopted in this report is as follows:

| | |
|---|---|
| Depleted bottom | Less than 25 bushels per acre. |
| Very scattering growth | Between 25 and 75 bushels per acre. |
| Scattering growth | Between 75 and 150 bushels per acre. |
| Dense growth | Over 150 bushels per acre. |

As the region is important for the production of seed rather than market oysters, all sizes are included in the estimates of the density of oyster growth, but all loose shells and other debris commonly dredged are excluded. "Depleted bottom" is not necessarily that which was formerly productive but now practically barren, but is merely an expression of the present impoverishment of the bed without respect to its past. In some cases it may be a formerly barren area slowly coming into productiveness.

The bottom rated as bearing a "very scattering growth" is the least productive bottom capable of furnishing a livelihood to the dredgers.

In the course of the survey 16,435 acres, or over 25 square miles, were explored with sounding lines and chains. Of this area 2,144 acres were found to be included in oyster beds of varying degrees of productiveness. In the survey the chain was dragged over 124 miles of the bottom, soundings were made at 5,772 places, and the position of the boat was instrumentally determined at 819 points.

## DESCRIPTION OF OYSTER GROUNDS.

### BOMBAY BED.

This is the northernmost public oyster bed within the confines of Delaware. Its northern limit is opposite the upper pier at Woodland Beach, and its southern end is a little below the small creek known locally as Tombstone. Its inner or southwestern edge is from 200 to 400 yards from shore, the average width of the bed is about one-fourth mile, and the total length slightly in excess of 1 mile.

The estimated area, density of growth, and contents of the bed are as follows:

OYSTER GROWTH ON BOMBAY BED.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Dense | 111 | 250 | 115 | 365 | 40,515 |
| Scattering | 12 | 103 | 23 | 126 | 2,512 |
| Very scattering | 6 | 22 | 5 | 27 | 162 |
| Depleted | 26 | 0 | 0 | 0 | 0 |
| Total | 155 | | | | 43,189 |

The dense area comprises a broad strip running along the entire inshore edge of the bed. The scattering areas are two, the larger lying near the middle of the outer edge of the bed and the smaller, a very narrow strip, on the offshore edge of the lower end. Both merge more or less gradually into the dense area with which they are continuous. The area of very scattering growth is a small patch situated near the offshore part of the upper end of the bed, in the midst of the depleted bottom. The latter appears to be a formerly moderately productive area which has become covered by a deposit of mud and now produces no oysters, although there are numerous buried shells lying on a hard bottom about 6 inches beneath the present surface. This bed differs from all others of the region treated in this report in being founded on a stony bottom, a considerable proportion of the oysters taken being attached to rock fragments. The oysters are in small clusters, with thin, sharp shells. Small oysters predominate, not only numerically but by measure. No drills were found and, reasoning from the low salinity of the water, probably do not occur. The specific gravity of the water at the time of examination, July 10, 1910, was about 1.005, and it is likely that the bed suffers periodically during freshets. The average depth of water is about 8 to 10 feet.

It was reported that there were oysters between the piers, but none were found, although there were a few attached to the piling and lying on the bottom in its vicinity.

The details of the examination of this bed are shown in the following table:

DETAILS OF EXAMINATIONS OF BOMBAY BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 183 | July 10 | 10 | Dense | 1.6 | 35.2 | 2.6 | 129 | 26 | 155 |
| 184 | do | 10 | do | 10.5 | 42.0 | 12.6 | 184 | 126 | 310 |
| 189 | do | 10 | do | 11.0 | 65.8 | 19.5 | 269 | 195 | 464 |
| 191 | do | 11 | do | 15.8 | 34.2 | 3.2 | 175 | 32 | 207 |
| 192 | do | 10 | do | 28.4 | 54.2 | 20.5 | 299 | 205 | 504 |
| 195 | do | 12 | do | 9.5 | 17.9 | 9.5 | 96 | 95 | 191 |
| 197 | do | 12 | do | 52.0 | 58.4 | 13.7 | 387 | 137 | 524 |
| 199 | do | 11 | do | 74.2 | 57.4 | 10.0 | 461 | 100 | 561 |
| 194 | do | 12 | Scattering | 11.0 | 12.6 | 3.7 | 83 | 37 | 120 |
| 198 | do | 12 | do | 35.2 | 0.0 | 1.0 | 123 | 10 | 133 |
| 186 | do | 10 | Very scattering | 0.0 | 6.3 | 0.5 | 22 | 5 | 27 |
| 185 | do | 11 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 187 | do | 10 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 188 | do | 10 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 190 | do | 11 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |

## THRUM-CAP BED.

For a distance of about 5 miles below Bombay bed the bottom is reported to be barren, with the possible exception of a few patches of insignificant size, and it was not deemed warrantable to incur the expense of an examination.

Thrum-cap bed is a somewhat triangular area lying about 1 mile offshore opposite the small stream known to the oystermen as Hay Ditch. It covers an area of about 78 acres, of which it is estimated 6 are covered by a dense growth, 14 by scattering, and 55 by very scattering, and 3 acres are characterized by a total absence of oysters, but with scattered shells buried in the mud.

The areas of dense and scattering growth form a narrow strip on the inshore edge of the bed, with the denser area at the upper end. The bottom covered with very scattering growth stretches in gradually decreasing productiveness from the outer edge of this strip toward the deeper water. The depleted area is a small patch where the dense growth shades off into the surrounding barren bottom. The depth of water on the bed varies from about 18 feet at the inshore edge to 22 feet on the outer border.

It is estimated that the bed contained at the time of examination 4,195 bushels of oysters of all sizes, of which the dense area bore 1,164 bushels, the scattering 1,106 bushels, and the very scattering 1,925 bushels.

There were comparatively few dead oysters, and no indications of the presence of drills were observed. In July the specific gravity of the water varied from about 1.003 at low water to 1.011 at high tide.

The results of the examinations of this bed are shown in the following table:

DETAILS OF EXAMINATIONS OF THRUM-CAP BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 179 | July 9 | 19 | Dense | 4.4 | 28.4 | 8.0 | 114 | 80 | 194 |
| 181 | do | 20 | Scattering | 5.5 | 12.2 | 1.7 | 62 | 17 | 79 |
| 178 | do | 22 | Very scattering | 1.7 | 3.3 | 1.7 | 18 | 17 | 35 |
| 180 | do | 19 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |

OVER-THE-BAR BED.

This bed, like the preceding, from which it is separated by a distance of a little over one-eighth of a mile, lies just beyond the edge of the shifting sands, which extend to about the 12-foot curve. It is about 1½ miles from shore, and takes its name from its position some distance outside of a long sand bar, which, according to the navigational charts, is covered by about 4 feet of water at low tide, but on which the present survey found water a little deeper. The depth on the bed itself varies from 15 to 20 feet.

The extent and general condition of the bed in July, 1910, is shown in the following table:

OYSTER GROWTH ON OVER-THE-BAR BED.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Dense | 109 | 103 | 162 | 275 | 29,975 |
| Very scattering | 15 | 41 | 0 | 41 | 615 |
| Depleted | 39 | 0 | 0 | 0 | 0 |
| Total | 163 | | | | 30,590 |

The dense growth is found on two areas, 41 and 68 acres in extent, respectively, separated by a depleted area containing nothing but buried shells. The upper area is long and narrow and contains a large preponderance of oysters over 3 inches long. The northern end of the lower area is similar, with four or five times as many large oysters as small ones, but in the southern the two are in approximately equal quantity, and the average of both sizes is about 335 bushels per acre. The area of very scattering growth is found at the inshore edge of the southern part of the bed, and was apparently formed by a recent strike on a previously depleted area. The three depleted areas lie at the ends and the middle of the bed, the latter in reality separating the rock into two distinct parts. The depleted

bottom bears no oysters and but few exposed shells and, apparently, has been formed either by the silting of sparsely productive bottom or by shells dragged by dredging from the rock on to the adjacent muddy bottom.

The oysters throughout the entire bed are long, narrow, sharp-edged, and inferior in quality, and are almost invariably in clusters, whose bases are buried in soft mud. The bottom throughout is soft, and there is apparent nowhere any depth of shell deposits such as are found on Silver bed and the Ridge.

The details of the examinations made on this bed are shown in the following table:

DETAILS OF EXAMINATIONS OF OVER-THE-BAR BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 169 | July 9 | 18 | Dense | 15.2 | 28.8 | 14.8 | 154 | 148 | 302 |
| 170 | do | 18 | do | 12.0 | 28.0 | 8.4 | 140 | 84 | 224 |
| 171 | do | 18 | do | 5.2 | 51.6 | 28.0 | 198 | 280 | 478 |
| 172 | do | 20 | do | 9.2 | 5.6 | 10.4 | 52 | 104 | 156 |
| 174 | do | 19 | do | 0.8 | 9.2 | 15.6 | 35 | 156 | 191 |
| 177 | do | 21 | do | 5.6 | 6.1 | 26.1 | 41 | 261 | 302 |
| 167 | do | 17 | Very scattering | 0.8 | 10.8 | 0.0 | 41 | 0 | 41 |
| 168 | do | 18 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 173 | do | 20 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 176 | do | 20 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 182 | do | 21 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |

## PATCHES BETWEEN OVER-THE-BAR AND SAND BEDS.

In the area between these beds are several small scattered patches of oysters, but two of which were examined to determine their character. One of these has an area of about 16 acres and is estimated to contain about 1,000 or 1,200 bushels of oysters. The other is about 5 acres in extent and contains probably about 200 bushels of oysters. On both beds and probably on other small patches in the vicinity the oysters are long, thin, and narrow, and are found in scattered clusters.

The following table exhibits the data obtained from the examinations:

DETAILS OF EXAMINATIONS OF PATCHES BETWEEN OVER-THE-BAR BED AND SAND BEDS.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 160 | July 8 | 19 | Very scattering | 0 | 2.8 | 3.2 | 10 | 32 | 42 |
| 162 | do | 15 | do | 0 | 3.0 | 6.3 | 11 | 63 | 74 |

### SAND BED.

Sand bed lies nearly north of the Ridge and northeast of Silver bed, being separated from the latter by a distance of about one-third of a mile. It covers an area of about 54 acres, of which 16 acres are covered by a dense growth of oysters and 11 acres by a scattering growth, the remaining 27 acres being depleted.

The productive bottom forms a zone along the inner edge of the bed, the southern and middle portions bearing the denser growth. The depleted bottom occupies the outer half of the bed. It is estimated that the bed contained about 4,600 bushels of oysters of all sizes at the time of examination, and that of these 3,700 bushels were on the area of dense growth, 700 bushels on the very scattered growth, and 200 bushels on the depleted bottom. Oysters over 3 inches long preponderated on the productive portions of the bed, but were inferior in quantity on the depleted area.

The oysters are superior in shape to those found on the bars north of this, being in smaller clusters and rounder. Dead oysters were comparatively few, and no indications of the drill were noted.

Several boats were observed working on Sand bed during the latter part of June, and it is reported that the bed was dredged to some extent earlier in the season.

The following examinations were made:

DETAILS OF EXAMINATIONS OF SAND BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 154 | July 8 | 20 | Dense | 1.2 | 24.4 | 14.4 | 90 | 144 | 234 |
| 159 | do | 19 | Very scattering | 4.0 | 1.2 | 4.8 | 18 | 48 | 66 |
| 155 | do | 18 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 156 | do | 19 | do | 0.4 | 2.4 | 0.4 | 10 | 4 | 14 |
| 157 | do | 19 | do | 1.6 | | 0.4 | 6 | 4 | 10 |

### LEIPSIC ROCK.

This is a small but exceedingly prolific bed lying in the mouth of Leipsic Creek within one-eighth of a mile of the shore. It is approximately circular in outline and consists of about 4 acres of very dense growth. It is estimated that the bed bears nearly 3,000 bushels of oysters, practically none of which is over 3 inches in length, and it is probable that it represents a recent rejuvenescence of an old bed. There is a deep deposit of shells forming the core of the bed, but around the edges this is covered by a deposit of mud which appears to be encroaching on and causing a gradual contraction of the productive area. It is probable that the oysters are subject to periodical destruction from fresh water and mud carried by freshets.

So far as could be learned the rock has not been worked for several years.

The following examinations were made:

DETAILS OF EXAMINATIONS OF LEIPSIC ROCK.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 140 | July 7 | 11 | Dense | 41.0 | 114.5 | 1.4 | 544 | 14 | 558 |
| 144 | do | 12 | do | 0.0 | 14.8 | 0.4 | 52 | 4 | 56 |
| 145 | do | 10 | do | 118.0 | 300.0 | 1.6 | 1,460 | 16 | 1,476 |

BED NORTH OF SILVER BED.

North of the western end of Silver bed and separated from it by about one-eighth of a mile of soft bottom in which scattering shells are buried is a nameless bed covering about 25 acres. There are about 8 acres covered by scattering growth estimated to contain about 900 bushels of oysters and about 17 acres of very scattering oysters containing about 750 bushels. The northern part of the bed, which bears the heaviest growth, has a substratum of shells, but the southern edge lies on sandy bottom. The proportion of large oysters is greater than on Silver bed.

The following observations were made:

DETAILS OF EXAMINATIONS OF BED NORTH OF SILVER BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 158 | July 8 | 14 | Scattering | 4.5 | 6.7 | 7.8 | 39 | 78 | 117 |
| 152 | do | 13 | Very scattering | 4.0 | 2.2 | 2.2 | 22 | 22 | 44 |

BETWEEN SILVER BED AND SIMONS CREEK.

Almost continuous with Silver bed and stretching for a distance of nearly one-half of a mile toward the mouth of Simons Creek is a bed of about 17 acres lying on the mud and sand. Its most productive area is nearest Silver bed, and the opposite end is bare except of scattered shells. The best part, about 5 acres in extent, bears a scattering growth of oysters estimated to contain about 375 bushels, and the area of very scattering growth which adjoins it bears about the same quantity on its 7 acres. The depleted bottom is practically bare at present, but is in a condition to catch a small set under favorable conditions.

The following table shows the results of examinations:

DETAILS OF EXAMINATIONS OF BED BETWEEN SILVER BED AND SIMONS CREEK.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 166 | July 8 | 9 | Scattering | 2.9 | 3.4 | 5.4 | 22 | 54 | 76 |
| 165 | ...do... | 9 | Very scattering | 0.0 | 4.3 | 3.7 | 15 | 37 | 52 |
| 111 | June 29 | 14 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |

## SILVER BED.

This bed, which is said to derive its name from the silvery color of the shells found on the hard rock, is, excepting the Ridge, the largest and most important natural bed in Delaware. It lies about 1 mile east of the mouth of Dona River, locally known as Simons Creek. The bed has a maximum extent of about a mile east and west and slightly over a half mile north and south, and it lies in a depth of water varying from 8 to 12 feet.

The following table shows its general extent and condition in July, 1910:

OYSTER GROWTH ON SILVER BED.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Dense | 65 | 171 | 74 | 245 | 15,925 |
| Scattering | 20 | 82 | 27 | 109 | 2,180 |
| Very scattering | 45 | 25 | 21 | 46 | 2,070 |
| Depleted | 140 | 8 | 2 | 10 | 1,400 |
| Total | 270 | | | | 21,575 |

The most productive parts of the bed lie in its northeast half and include a belt of dense and scattering growth about one-half mile long and varying from one-eighth to one-third mile in width.

A considerable part of the bottom covered by the bed is macadamized with a dense accumulation of shells, or probably two such areas separated by a belt of muddy bottom. In places the bottom was so hard with compacted shells and so smooth that a boat anchor would not take hold. Although this bed is not now raised above the surrounding barren bottom, it is probable that it originally formed a knoll, the crest of which has been cut away by dredging and tonging.

The area of dense growth lies in a compact body occupying the middle of the eastern half of the bed, gradually merging with two

small areas of scattering growth at the northwest and southeast ends, respectively. There is a third area of scattering growth near the western end of the bed. The very scattering growth forms a zone around the western and part of the southern side of the more prolific bottom, lying on a substratum of compacted shells. Most of the western half of the bed is composed of depleted bottom, which also extends as a narrow strip around practically the entire circumference of the rest of the bed, the bottom being generally hard and shelly with occasional patches of mud.

In general the present condition of the bed indicates a former greater extent of productive bottom. There is every indication that it has been closely dredged during the past season, and the present content of oysters is probably but a small proportion of the quantity on the bottom at the beginning of the season. The shells are in excellent condition to receive a set of spat, and under favorable circumstances the bed should speedily recuperate. There were comparatively few dead oysters, and drills or borers do not appear to be troublesome.

The following observations were made:

DETAILS OF EXAMINATIONS OF SILVER BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 58 | June 25 | 14 | Dense | 23.7 | 65.0 | 12.2 | 310 | 122 | 432 |
| 110 | June 29 | 14 | do | 5.9 | 21.1 | 6.7 | 94 | 67 | 161 |
| 149 | July 8 | 13 | do | 1.5 | 29.6 | 7.8 | 109 | 78 | 187 |
| 163 | do | 10 | do | 8.7 | 40.0 | 2.9 | 170 | 29 | 199 |
| 55 | June 25 | 14 | Scattering | 12.2 | 7.4 | 1.9 | 69 | 19 | 88 |
| 147 | July 8 | 14 | do | 1.4 | 22.2 | 3.3 | 83 | 33 | 116 |
| 164 | do | 9 | do | 4.3 | 22.9 | 2.9 | 95 | 29 | 124 |
| 59 | June 25 | 13 | Very scattering | 0.4 | 3.3 | 1.2 | 13 | 12 | 25 |
| 100 | June 27 | 11 | do | 2.4 | 7.9 | 1.7 | 36 | 17 | 53 |
| 150 | July 8 | 13 | do | 2.6 | 4.5 | 3.3 | 25 | 33 | 58 |
| 52 | June 25 | | Depleted | | | | | | |
| 53 | do | 13 | do | 0.3 | 4.5 | 0.0 | 17 | 0 | 17 |
| 60 | do | 13 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 98 | June 27 | 11 | do | 0.0 | 2.8 | 0.3 | 10 | 3 | 13 |
| 99 | do | 11 | do | 1.4 | 1.0 | 0.7 | 8 | 7 | 15 |
| 109 | June 29 | 14 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 148 | July 8 | 13 | do | 1.1 | 2.2 | 0.0 | 11 | 0 | 11 |

## LUMPS BETWEEN SILVER AND RIDGE BEDS.

Lying between Sand and Silver beds on the north and Ridge and Drum beds on the south are a number of small lumps and patches surrounded by a considerable area of barren bottom. Eight of these areas were located by the survey, most of them covering areas of 3 or 4 acres, and there are probably a number of others, as on account of their small size and irregular distribution but little time was spent in

looking for them. But three of these places were examined in detail, and their location may be determined by an inspection of the chart. One of them was about 3 acres in extent and was estimated to contain about 2,500 bushels of long, sharp-edged oysters in large clusters, growing on a soft, muddy bottom. The other two spots examined bore a very scattering growth. The largest of these, about one-fourth mile inshore of the upper end of Drum bed, was estimated to be about 8 acres in extent and to contain about 300 bushels of oysters. The other, just south of the middle of Silver bed, has an area of about 4 acres and contained at the time of examination about 120 bushels of oysters.

The five areas located but not examined varied in extent from about 1 to 14 acres, and are situated variously. They are shown on the chart as unshaded places surrounded by red lines. Judging from the chain readings none of them is particularly productive.

The following observations were made in this region:

DETAILS OF EXAMINATIONS OF LUMPS BETWEEN SILVER AND RIDGE BEDS.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 96 | June 27 | 18 | Dense | 1.4 | 28.0 | 75.2 | 103 | 752 | 855 |
| 86 | do | 15 | Very scattering | 0.7 | 4.1 | 1.9 | 17 | 19 | 36 |
| 97 | do | 13 | do | 0.0 | 2.2 | 2.2 | 8 | 22 | 30 |

## DRUM BED.

Drum bed lies west of and very close to the depleted edge of the ridge and about 1 mile from shore. It has a length of over one-half mile, a width of about one-fourth mile, and a total area of approximately 68 acres. Its condition and the relative extent of oyster growths of the several degrees of productiveness are shown in the following table:

OYSTER GROWTH ON DRUM BED.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Dense | 16 | 139 | 83 | 222 | 3,552 |
| Scattering | 21 | 30 | 65 | 95 | 1,995 |
| Very scattering | 19 | 32 | 18 | 50 | 950 |
| Depleted | 12 | 1 | 6 | 7 | 84 |
| Total | 68 | | | | 6,581 |

The most prolific part of the bed is an area about one-fourth mile square extending across its middle, consisting of an area of dense growth flanked on each side by one bearing a scattering growth. The northern end of the bed is composed of a gradually narrowing area of very scattering growth, and there is a small patch of similar character at the inside corner of the southern end.

The depleted bottom is in two patches, one adjoining the scattering and very scattering growths at the lower end and the other interposed between the dense scattering and very scattering oyster deposits just above the middle. The bottom is soft on the areas of very scattering growth and on part of the northernmost depleted area, but is elsewhere hard and shelly.

Small oysters exceed in quantity those over 3 inches long, excepting on the area of scattering growth, where there are about twice as many large as small ones. Loose shells are in fair abundance and of a character to catch a good set under favorable conditions.

The following observations were made:

DETAILS OF EXAMINATIONS OF DRUM BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 47 | June 25 | 16 | Dense | 27.2 | 18.8 | 3.6 | 161 | 36 | 197 |
| 48 | do | 16½ | do | 16.0 | 30.0 | 7.6 | 161 | 76 | 237 |
| 107 | June 29 | 17 | do | 4.0 | 23.2 | 13.6 | 95 | 136 | 231 |
| 51 | June 25 | 17 | Scattering | 7.2 | 13.2 | 3.2 | 71 | 32 | 103 |
| 84 | June 27 | 17 | do | 1.4 | 10.0 | 8.2 | 4 | 82 | 86 |
| 106 | June 29 | 18 | do | 1.6 | 2.8 | 8.2 | 15 | 82 | 97 |
| 105 | do | 18 | Very scattering | 1.6 | 9.2 | 1.6 | 37 | 16 | 53 |
| 108 | do | 17 | do | 0.0 | 7.6 | 2.0 | 27 | 20 | 47 |
| 73 | June 27 | 15 | Depleted | 0.0 | 0.4 | 0.4 | 1 | 4 | 5 |
| 85 | do | 17 | do | 0.0 | 0.0 | 0.8 | 0 | 8 | 8 |

## RIDGE BED.

The Ridge bed, known to the oystermen as "The Ridge," is at present the most important natural bed in Delaware, and during the period of the present survey it sustained by far the heaviest dredging. During the latter half of June numerous vessels were at work daily and until the end of the month, when the dredging season closed, there appeared to be a fair catch.

The Ridge lies about 1½ miles from the nearest shore, midway between Dona River and Mahon River. It is triangular in shape, with a deep indentation or slough of muddy bottom projecting deeply into its base at the southern end. It has an extent of slightly over 1 mile north and south and its southern end is almost of equal extent east and west. It has a total area of 371 acres and the most productive bottom, that which is rated in this report as bearing dense and

scattering growths, stretches from the northern apex to about the middle of the bed, where it divides into two limbs astride the slough before alluded to.

It is evident that this bed, like Silver bed, is an old one, and without doubt its central portions, those which now bear the heaviest growth of oysters, were formerly elevated above the surrounding bottom to form a shoal or ridge which has been pulled down and in large part carried away by the oystermen, particularly the dredgers, until at present the water over it shoals but little as compared with the surrounding barren areas. The great deposit of shells which originally existed has been taken up and the bottom so denuded that in places the originally underlying mud has been brought to the surface. Many little patches of bare mud were found where there was every reason to expect a deposit of shells and oysters and it was apparent that the bed was being overworked.

The general condition and extent of the bed at the end of June, 1910, is shown in the following table:

Oyster Growth on Ridge Bed.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Dense | 49 | 160 | 23 | 183 | 8,967 |
| Scattering | 86 | 96 | 25 | 121 | 10,406 |
| Very scattering | 65 | 36 | 21 | 57 | 3,705 |
| Depleted | 171 | 4 | 1 | 5 | 855 |
| Total | 371 | | | | 23,933 |

The dense areas are two in number, separated by an area of scattered growth. The smaller of these areas lies at the northern apex of the bed and the larger one is a long belt along most of its eastern side. More or less soft mud is to be found in the former, especially near its upper edge, but the latter rests on a solid substratum of shells.

The lower end of the larger dense area gradually verges into a small spot of scattering growth, but most of the bottom bearing a growth of this character is embraced in a long, somewhat S-shaped strip running from near the northern end of the bed almost to its southwest corner. The northern end, especially between and adjacent to the dense growths, is most productive.

The very scattering growth is all confined to the southern edge of the bed, most of it being between the mud slough and the dense and scattering growth. Excepting close to the more productive areas there is much muddy bottom in this area. Most of the depleted

bottom lies on the west side of the bed, but there is a narrow strip along the eastern edge and embracing the southern end of the dense and scattering growth. Much of the depleted area is in reality denuded or barren, and although most of it lies on hard bottom there are numerous muddy spots, especially near the southern edge.

On this bed as a whole and especially on the more productive areas small oysters are in great preponderance. In many cases there were quantities of oysters so small that they fell between the teeth of the tongs.

The following observations were made on this bed:

DETAILS OF EXAMINATIONS OF RIDGE BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 67 | June 26 | 17 | Dense | 20.0 | 20.0 | 3.9 | 140 | 39 | 179 |
| 91 | June 27 | 18 | do | 31.2 | 21.2 | 1.6 | 183 | 16 | 199 |
| 93 | do | 16 | do | 29.1 | 16.0 | 1.6 | 158 | 16 | 174 |
| 62 | June 26 | 16 | Scattering | 19.2 | 7.6 | 2.0 | 94 | 20 | 114 |
| 65 | do | 16 | do | 16.0 | 12.0 | 4.0 | 98 | 40 | 138 |
| 69 | do | 18 | do | 17.2 | 13.6 | 2.8 | 108 | 28 | 136 |
| 92 | June 27 | 16 | do | 28.8 | 4.4 | 2.0 | 116 | 20 | 136 |
| 101 | do | 15 | do | 7.4 | 10.7 | 1.9 | 63 | 19 | 82 |
| 61 | June 26 | 14 | Very scattering | 4.8 | 1.1 | 0.7 | 21 | 7 | 28 |
| 63 | do | 15 | do | 2.2 | 3.7 | 5.2 | 21 | 52 | 73 |
| 79 | June 27 | 16 | do | 0.8 | 10.4 | 2.4 | 39 | 24 | 63 |
| 90 | do | 17 | do | 12.4 | 5.2 | 0.0 | 62 | 0 | 62 |
| 64 | June 26 | 16 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 66 | do | 16 | do | 1.2 | 2.0 | 0.0 | 11 | 0 | 11 |
| 70 | do | 17 | do | 2.0 | 2.4 | 0.0 | 15 | 0 | 15 |
| 80 | June 27 | 15 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 81 | do | 14 | do | 2.6 | 0.7 | 0.4 | 12 | 4 | 16 |
| 82 | do | 16 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 83 | do | 17 | do | 0.4 | 0.4 | 0.0 | 3 | 0 | 3 |
| 87 | do | 16 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 88 | do | 16 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 89 | do | 16 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 102 | do | 13 | do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 103 | do | 13 | do | 0.0 | 0.4 | 1.1 | 1 | 11 | 12 |

## SMALL BEDS NORTHEAST OF RIDGE BED.

Northeast of the Ridge is a small patch of about 7 acres of very scattering growth which is estimated to contain about 200 bushels of oysters, most of them over 3 inches in length.

The following results were obtained from an examination of this area:

DETAILS OF EXAMINATIONS OF SMALL BEDS NORTHEAST OF RIDGE BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 94 | June 27 | 18 | Very scattering | 0 | 1.4 | 2.4 | 5 | 24 | 29 |

### OLD BED.

Old bed lies close to the southeastern edge of the Ridge, from which it is separated by a narrow strip of mud with many buried shells. It is stated that the dredgers sometimes haul across the barren bottom from one bed to the other.

The condition and extent of the bed as determined by the survey were as follows:

OYSTER GROWTH ON OLD BED.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Very scattering | 20 | 40 | 2 | 42 | 840 |
| Depleted | 17 | 10 | 3 | 13 | 221 |
| Total | 37 | | | | 1,061 |

Although the bed is at present not very productive it has the appearance of former greater value. It lies on a dense bed of shells and is undoubtedly the remnant of an old accumulation. There are very few large oysters to be found, but the young growth is fair in places and the conditions for a new set are good. The bed evidently has been subjected to severe dredging.

The following observations were made:

DETAILS OF EXAMINATIONS OF OLD BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 76 | June 27 | 16 | Very scattering | 10.4 | 2.8 | 0.0 | 46 | 0 | 46 |
| 130 | June 30 | 17 | do | 6.0 | 1.4 | 0.0 | 26 | 0 | 26 |
| 131 | do | 19 | do | 0.8 | 5.6 | 0.8 | 22 | 8 | 30 |
| 132 | do | 19 | do | 10.4 | 11.6 | 0.0 | 77 | 0 | 77 |
| 133 | do | 19 | do | 4.8 | 4.4 | 0.0 | 32 | 0 | 32 |
| 74 | June 27 | 17 | Depleted | 0.0 | 2.0 | 0.0 | 7 | 0 | 7 |
| 75 | do | 18 | do | 1.2 | 2.0 | 0.8 | 11 | 8 | 19 |
| 78 | do | 17 | do | 0.0 | 1.2 | 0.4 | 4 | 4 | 8 |
| 134 | June 30 | 20 | do | 0.6 | 4.4 | 0.0 | 18 | 0 | 18 |

### OUTSIDE OF OLD BED.

Immediately outside of Old bed is an area of about 16 acres, surrounded by sand, for which the oystermen appear to have no name, if, even, they are aware of its existence. But one observation was made at this place, where a dense growth of young oysters was found. If the other parts of the bed are equally productive this patch contains about 6,800 bushels of oysters, practically all of them under 3 inches in length. The present growth is apparently of recent origin.

The following results were obtained from the examination:

DETAILS OF EXAMINATIONS OF BEDS OUTSIDE OF OLD BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 77..... | June 27 | 15 | Dense..... | 35.0 | 83.4 | 15.0 | 414 | 15 | 429 |

SCATTERED PATCHES BETWEEN RIDGE AND SOUTHWEST BEDS.

On the soft bottom lying between these two beds are a number of little patches of oyster growth, of which five were located with the chain and three were examined by tonging. The latter were all highly productive, and they probably represent the possibilities of oyster production in this vicinity on beds not frequented by the dredgers.

The three beds examined covered a total of 11 acres, and it is estimated that they contained about 5,300 bushels of oysters, of which nearly three-fourths were over 3 inches long. Based on the results of the examination, and assuming that the other beds found are equally productive, the five beds probably contain about 11,000 bushels, and it is probable that at least 20,000 bushels are scattered in little 2 to 5 acre patches in the vicinity.

The following table shows the data obtained from examinations:

DETAILS OF EXAMINATIONS OF SMALL SCATTERED PATCHES BETWEEN RIDGE AND SOUTHWEST BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 40..... | June 22 | 12 | Dense..... | 20.3 | 21.1 | 21.1 | 145 | 211 | 356 |
| 42..... | ...do..... | 14 | .....do..... | 15.2 | 30.4 | 20.7 | 159 | 207 | 366 |
| 71..... | June 27 | 14 | .....do..... | 15.2 | 14.4 | 71.5 | 104 | 715 | 819 |

SOUTHWEST BED.

Southwest bed lies in the southeastern part of the present productive natural oyster grounds of the State and its southern edge is about one-fourth mile north of the "east line" which separates the private beds from the public ones. It has a north and south extent of upward of one-half mile and a maximum width of about one-third mile, containing all told about 106 acres.

The extent and relative productiveness of the bottoms, as classified in this report, are shown in the table following.

OYSTER GROWTH ON SOUTHWEST BED.

| Character of oyster growth. | Area. | Oysters per acre. | | | Estimated content of oysters. |
|---|---|---|---|---|---|
| | | Under 3 inches. | Over 3 inches. | Total. | |
| | *Acres.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Dense | 11 | 40 | 744 | 784 | 8,624 |
| Scattering | 8 | 99 | 48 | 147 | 1,376 |
| Very scattering | 31 | 18 | 13 | 31 | 961 |
| Depleted | 56 | 4 | 1 | 5 | 280 |
| Total | 106 | | | | 11,241 |

The area of dense growth is near the southern end of the bed and is flanked on the east and west sides by a very scattering growth, and on the north and south by depleted bottom. Most of the oysters are over 3 inches long and they appear to be in numerous small patches on the soft mud. The place has the appearance of bottom which has been overlooked by the oystermen and may as a whole be somewhat smaller in area than is indicated in the preceding table.

The bottom bearing scattering growth lies at the northeast edge of the bed and at its southwestern limits merges into a strip of very scattering growth running along the western edge of the bed as far as the densely covered bottom first described. There is another small patch of very scattering growth near the southeast corner of the bed.

The depleted bottom lies in three patches, one at each end of the bed and the other at the middle of the eastern edge.

Although it is not known whether Southwest bed was dredged during the past season, it bears every evidence that it has been overworked. Excepting on the small area of dense growth there are few marketable oysters, and bare or almost bare muddy spots are of frequent occurrence. Many oysters had been killed by drills and many of these animals and their egg cases were found.

The following table shows the results of examinations:

DETAILS OF EXAMINATIONS OF SOUTHWEST BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 126 | June 30 | 14 | Dense | 1.5 | 10.0 | 74.4 | 40 | 744 | 784 |
| 31 | June 22 | 13 | Scattering | 5.6 | 22.7 | 4.8 | 99 | 48 | 147 |
| 121 | June 30 | 13 | Very scattering | 0.4 | 5.6 | 0.4 | 21 | 4 | 25 |
| 122 | ...do | 12 | ....do | 1.5 | 7.5 | 0.4 | 31 | 4 | 35 |
| 128 | ...do | 15 | ....do | 0.0 | 1.4 | 3.0 | 5 | 30 | 35 |
| 129 | ...do | 14 | ....do | 0.0 | 4.4 | 1.5 | 15 | 15 | 30 |
| 32 | June 22 | 13 | Depleted | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 120 | June 30 | 14 | ....do | 0.4 | 4.4 | 0.0 | 17 | 0 | 17 |
| 123 | ...do | 12 | ....do | 0.0 | 1.4 | 0.4 | 5 | 4 | 9 |
| 124 | ...do | 13 | ....do | 0.0 | 0.0 | 0.4 | 0 | 4 | 4 |
| 125 | ...do | 15 | ....do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |
| 127 | ...do | 15 | ....do | 0.0 | 0.0 | 0.0 | 0 | 0 | 0 |

### STONE BED.

This bed possibly takes its name from the quantity of hard, sandy worm tubes, known to the oystermen as "stone coral," which are found attached to and overgrowing the oysters. It is probable that a good many of the latter are stifled and killed by this growth, which is even more abundant on a small depleted patch lying between the Stone bed and the mouth of Mahon River.

The bed covers an area of about 33 acres of very scattering growth, on which there is an average of about 53 bushels of oysters per acre. It is estimated that about July 1, 1910, there were on the entire bed about 1,750 bushels of oysters, the large and small being in about equal quantities.

The following observations were made:

DETAILS OF EXAMINATION OF STONE BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 36 | June 22 | 13 | Very scattering | 0.7 | 4.8 | 2.6 | 19 | 26 | 45 |
| 104 | June 29 | 18 | do | ..... | 10.0 | 2.4 | 35 | 24 | 59 |

### EAST LINE BED.

This bed lies just at the line which marks the southern limits of the public grounds, and it appears that for that reason it has a sentimental interest to the oystermen. It has a diameter not much greater than the length of a boat and is too small to plot on the chart, on which its position is indicated by a circle.

Numerous examinations were made in its vicinity over an area of 6 or 8 acres, but at only one place were oysters found, and there they were very dense and mostly of marketable size.

The data obtained at this station are shown in the following table:

DETAILS OF EXAMINATIONS OF EAST LINE BED.

| Station number. | Date of examination. | Depth of water. | Character of growth. | Oysters caught per square yard. | | | Estimated quantity oysters per acre. | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | Spat. | Culls. | Counts. | Seed. | Market. | Total. |
| | 1910. | *Feet.* | | *No.* | *No.* | *No.* | *Bu.* | *Bu.* | *Bu.* |
| 118 | June 30 | 13 | Dense | 0.0 | 10.0 | 77.8 | 35 | 778 | 813 |

### FLOGGER BED.

Flogger bed lies along Joe Flogger Shoal, which separates Blake Channel from the ship channel. As developed by the survey, it is the largest bed in Delaware, having a length of over 3 miles, an average width of about one-third mile, and an area of about 660 acres. Owing to its exposed situation and the depth of water, as well as to the contradictory information received as to its approximate location and extent, it was the most troublesome bed encountered by the survey. Lines were run across Joe Flogger Shoal from its extreme southern end, but no indications of shells or oysters were encountered until within about one-half mile of east line. From this point scattering shells were found, but when the bottom was examined with the tongs these were discovered to be more or less submerged in the sand.

The bed as outlined on the chart was located almost entirely by means of the chain. At its upper end it lies on the eastern or ship-channel side of Joe Flogger Shoal, but about a mile from its upper end it expands to the westward over an area of somewhat deeper water, and thence, to its southern end, continues on the western or Blake Channel side of the shoal. It was at this point of expansion only that oysters were found, in one small patch of very scattering growth and two or three areas of depleted bottom. The results were not of sufficient importance to exhibit in detail on the chart. It is possible that oysters are to be found in limited quantities in some of the deeper water, but the chain readings did not indicate patches of sufficient importance to warrant the expense of making dredgings. It is reported that there are oysters in some of the deep water of the ship channel, but no indications were found in such places as were examined.

It is understood that Flogger bed has not been dredged for several years, and the survey indicated that while formerly it may have been of importance commensurate with its area, it has become covered with sand throughout practically its whole extent. It may again become productive, but there is no present indication of this probability.

Oysters were reported around the buoy at the head of Flogger Shoal and at another buoy on the opposite side of Blake Channel, but a careful examination, expecially in the latter place, failed to disclose them.

### THE BEDS IN SUMMARY.

The oyster bottoms of Delaware all lie between Woodland Beach and the vicinity of Bowers Beach, covering an area about 21 miles long and with an average width of about 3 miles. South and west of a line running east from the old Mahon River Lighthouse and thence approximately southeasterly along Blake Channel, the bottoms are excluded from the common oyster fishery and a considerable proportion of the area is leased to private persons and firms for purposes of oyster culture.

With this area this report will not deal, as it was examined by the writer in but the most cursory manner and the survey of the private beds was being made solely as a State undertaking. It may be stated, however, that the private beds are planted partly with shells, mostly brought from points on Chesapeake Bay, but generally with seed oysters taken from the natural beds. The grounds are in large part leased or controlled by residents of Philadelphia and New Jersey, and the product is consumed principally in Philadelphia, being marketed through Maurice River Cove in New Jersey.

The natural rocks, with which alone this report is concerned, lie in a narrow strip between Blake Channel and the main ship channel on what is known as Joe Flogger Shoal, and between these channels and the Delaware shore in a belt which stretches from the east line above mentioned to about abreast of the upper pier at Woodland Beach, a distance of about 13 miles.

At its southeastern end, where it adjoins the planted area, this zone is about 3 miles in width, but it gradually narrows to the northward until at its upper extremity it is hardly one-half mile wide. The most extensive beds lie in the lower half of the zone and the most intense fishery is carried on in that region. During the time of the survey this was practically the only place in which the dredgers were operating, and we were informed that but little had been done elsewhere earlier in the season.

The following tables summarize the data of the extent, condition, and general distribution of oyster growth on the several beds previously discussed in more detail:

AREAS OF OYSTER BEDS.

| Name of bed. | Character of oyster growth. | | | | | Total. |
|---|---|---|---|---|---|---|
| | Dense. | Scattering. | Very scattering. | Depleted. | Not determined. | |
| | *Acres.* | *Acres.* | *Acres.* | *Acres.* | *Acres.* | *Acres.* |
| Bombay | 111 | 12 | 6 | 26 | ..... | 155 |
| Thrum-cap | 6 | 14 | 55 | 3 | ..... | 78 |
| Over-the-Bar | 109 | ..... | 15 | 39 | ..... | 163 |
| Between Over-the-Bar and Sand | ..... | ..... | 21 | ..... | ..... | 21 |
| Sand | 16 | ..... | 11 | 27 | ..... | 54 |
| Leipsic Rock | 4 | ..... | ..... | ..... | ..... | 4 |
| North of Silver | ..... | 8 | 17 | ..... | ..... | 25 |
| Between Silver and Simons Creek | ..... | 5 | 7 | 5 | ..... | 17 |
| Silver | 65 | 20 | 45 | 140 | ..... | 270 |
| Between Silver and Ridge | 3 | ..... | 12 | ..... | 21 | 36 |
| Drum | 16 | 21 | 19 | 12 | ..... | 68 |
| Ridge | 49 | 86 | 65 | 171 | ..... | 371 |
| Northeast of Ridge | ..... | ..... | 7 | ..... | ..... | 7 |
| Old | ..... | ..... | 20 | 17 | ..... | 37 |
| Outside of Old | 16 | ..... | ..... | ..... | ..... | 16 |
| Between Ridge and Southwest | 11 | ..... | ..... | ..... | 12 | 23 |
| Southwest | 11 | 8 | 31 | 56 | ..... | 106 |
| Stone | ..... | ..... | 33 | ..... | ..... | 33 |
| East Line | [1] | ..... | ..... | ..... | ..... | [1] |
| Flogger | ..... | ..... | ..... | ..... | [2] 660 | 660 |
| Total | 417 | 174 | 364 | 496 | 693 | 2,144 |

[1] Less than 1 acre.

[2] Practically all depleted.

ESTIMATED OYSTER CONTENT OF NATURAL BEDS, JULY 1, 1910.

| Name of bed. | Character of oyster growth. | | | | | Total. |
|---|---|---|---|---|---|---|
| | Dense. | Scattering. | Very scattering. | Depleted. | Not determined. | |
| | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* | *Bushels.* |
| Bombay | 40,515 | 2,512 | 162 | ..... | ..... | 43,189 |
| Thrum-cap | 1,164 | 1,106 | [1] 1,925 | ..... | ..... | 4,195 |
| Over-the-Bar | 29,975 | ..... | 615 | ..... | ..... | 30,590 |
| Between Over-the-Bar and Sand | ..... | ..... | 1,200 | ..... | ..... | 1,200 |
| Sand | 3,700 | ..... | 700 | 200 | ..... | 4,600 |
| Leipsic Rock | 3,000 | ..... | ..... | ..... | ..... | 3,000 |
| North of Silver | ..... | 900 | 750 | ..... | ..... | 1,650 |
| Between Sand and Simons Creek | ..... | 375 | 375 | ..... | ..... | 750 |
| Silver | 15,925 | 2,180 | 2,070 | 1,400 | ..... | 21,575 |
| Between Silver and Ridge | 2,500 | ..... | 420 | ..... | [1] 3,000 | 5,920 |
| Drum | 3,552 | 1,995 | 950 | 84 | ..... | 6,581 |
| Ridge | 8,967 | 10,406 | 3,705 | 855 | ..... | 23,933 |
| Patch northeast of Ridge | ..... | ..... | 200 | ..... | ..... | 200 |
| Old | ..... | ..... | 840 | 221 | ..... | 1,061 |
| Outside of Old | 6,800 | ..... | ..... | ..... | ..... | 6,800 |
| Between Ridge and Southwest | 5,300 | ..... | ..... | ..... | [1] 15,000 | 20,300 |
| Southwest | 8,624 | 1,376 | 961 | 280 | ..... | 11,241 |
| Stone | ..... | ..... | 1,750 | ..... | ..... | 1,750 |
| East Line | [1] 500 | ..... | ..... | ..... | ..... | [1] 500 |
| Flogger | ..... | ..... | ..... | ..... | [2] | [2] |
| Total | 130,522 | 20,850 | 16,623 | 3,040 | 18,000 | 189,035 |

[1] Estimated from chain indications.

[2] Practically all depleted.

Combining the foregoing data, an interesting comparison may be instituted between the beds sustaining a heavy fishery with dredges and those which recently have been worked but little. According to the best information, supported by our own observations in the latter part of the season, practically all of the dredging in 1910 was on the beds south of Over-the-Bar, although a few vessels were observed apparently working on Thrum-cap. These beds, excluding Flogger, had a total area of 1,088 acres and a total estimated oyster content of 111,061 bushels, or an average of 102 bushels per acre, at the end of the season. On the beds which were reported or observed to be most severely worked the oyster content averaged considerably less than this. On the Ridge the average for the whole bed was about 60 bushels per acre, on Drum bed about 97 bushels, on Silver bed about 80 bushels, on Old bed 30 bushels, and on Southwest bed about 106 bushels, and for the five beds taken as a whole the average was about 75 bushels per acre.

The beds above and including Over-the Bar have an area of 396 acres and a total estimated content of 77,984 bushels of oysters of all sizes, or an average of 197 bushels per acre. These beds, owing to their position, are probably more subject than the lower beds to damage from freshets and are probably naturally less productive, yet they had at the time of examination an oyster growth over 2½ times as dense. If we consider the various small patches surrounding the five beds enumerated above, which are in general too small to dredge or which, if large enough, have been overlooked during the season

recently closed, the disparity is still greater. Those which were examined by tonging had an area of 46 acres and an estimated content of 18,000 bushels of oysters, an average of nearly 390 bushels per acre, over five times the density of growth on the large beds in the vicinity.

The number of bushels taken from the beds of Delaware during the past season is not known but it was probably several hundred thousand bushels, and from the conditions found in the survey and the data just deduced it probably can be safely assumed that oysters were from three to five times as abundant at the beginning of the season as they were in its closing days when the survey was made.

This heavy draft on the beds would be less serious were it not accompanied by an abuse for which there is no excuse. In a region devoted mainly to planting and where a comparatively small quantity of oysters is marketed directly from the natural beds it is economically advisable to permit the taking of small oysters as well as large. So long as there is an abundance of shells on the bottom and a reasonable quantity of oysters is left to furnish spawn there will be, under favorable conditions of water and temperature, a more or less regular set of spat and the oyster population of the beds will be fairly maintained, although, of course, the proportion of oysters of marketable size will diminish. When, however, the beds are stripped of shells, as appears to be the case in Delaware, they will surely become depleted.

During the survey, although a number of vessels were actively dredging, no member of the party observed a boat engaged in culling. Inquiry among the oystermen elicited the information that while the boats catching seed oysters for sale generally cull their catch because the planters will not pay oyster prices for shells, the vessels owned or operated by planters when dredging on the public beds rarely do so. They are charged with carrying away everything which the dredge picks up, the shells being valuable for hardening the bottoms on their planting grounds and as cultch for catching a set of spat.

That some vessels are guilty of such behavior is within the knowledge of the writer, and moreover the charge is supported by the condition of the beds. One of the most noteworthy of the facts disclosed by the tong examinations was the small quantity of shells found as compared with similar examinations of beds in other States. On the five important beds in the vicinity of the Ridge there are less than 2 per cent as many shells per square yard as are found on the seed beds of James River, Va., where culling is strictly enforced. In places the deep pavement of shells which must have existed formerly has been completely removed and the underlying mud now shows itself in patches in the midst of the beds. A hard-worked bed to be in a healthy condition should contain an abundance of shells. The ultimate result of the continuance of this state of affairs is not difficult

to foresee. Oysters can not set on the mud. They must have some hard, clean object to which to attach when they settle down from their infantile free-swimming habit, and on the beds the old shells and the oysters themselves offer the only possibilities. If there be few or no shells the recuperation of exhausted beds is correspondingly retarded. If both shells and oysters are persistently removed, the most productive bed eventually will be hopelessly depleted.

## PHYSICAL AND BIOLOGICAL CONDITIONS.

### TIDES AND CURRENTS.

A staff tide gauge was established at the wharf at Mahon River Light-house and readings were taken hourly from 8 a. m. until 5 p. m. during the period of the survey. This does not furnish a very accurate plane of reference, but as the location of the gauge was central with respect to the more important beds it is sufficiently accurate for the purposes of this report. The average rise and fall of the tide between June 19 and July 10 was 5.4 feet, the minimum being 4.5 feet on July 10 and the maximum 6.3 on July 2.

No measurements of the velocity of currents were made, but in general it may be stated that they are strong throughout the region embraced in this report.

### SALINITY OF THE WATER.

The salinity of the water exhibited a very considerable range within the limits covered by the survey. From June 18 to July 10 observations were made three times daily at the anchorage of the *Fish Hawk* and several times each day on the oyster beds undergoing examination. Most of the observations on the *Fish Hawk* were made at a point about 1 mile south of the east line and about 3 miles offshore, but others, fewer in number, were made near the southern limit of the planted beds, near the middle of the north and south extent of the public beds, and at the upper limit of oyster growth opposite Woodland Beach.

The data obtained are shown in the following table:

SALINITY OF WATER OVER OYSTER BEDS, JUNE 18 TO JULY 10.

| Locality. | Number of observations. | Specific gravity of water corrected. | | | Average temperature of water. |
|---|---|---|---|---|---|
| | | Maximum. | Minimum. | Average. | |
| | | | | | °F. |
| Opposite Woodland Beach | 3 | 1.0074 | 1.0032 | 1.0057 | 79 |
| Midway between Ship John and Elbow Light-house | 3 | 1.0121 | 1.0100 | 1.0107 | 77 |
| 3¼ miles southeast by east of Mahon River Light | 33 | 1.0149 | 1.0103 | 1.0136 | 77 |
| 6 miles east-northeast of Bowers Beach | 6 | 1.0178 | 1.0158 | 1.0164 | 68 |

At the upper limit of oyster growth the salinity of the water was low at a time when there had been comparatively little rainfall, and it is probable that it may become practically fresh at this point during periods of freshet. This is without much doubt the cause inhibiting the growth of oysters at places higher up the river.

At the southern end of the planting grounds the salinity is comparatively high and in consequence it is to be expected that the drill or borer would be destructive. On the more important of the public beds, those lying between the east line and the mouth of Leipsic Creek, the density is favorable for the welfare of the oysters. It probably never falls so low as seriously to threaten the beds, and, on the other hand, it is hardly high enough, excepting close to the east line, to favor an abundance of drills.

## ENEMIES OF THE OYSTER.

It is stated that schools of drumfish occasionally appear on the oyster beds of Delaware Bay and cause much damage, but none were observed during the survey. This enemy of the oyster is usually more destructive on planted beds than on the public rocks, probably because the single-culled oysters on the former are easier to crush than are the clustered, sharp-edged specimens more common on the natural beds. The inroads of the drumfish are sporadic and unexpected in most places, although on the coasts of some of the Southern States they are frequent enough to warrant the inclosure of the planted beds with wire fences. This appears to be the only really adequate protection, though if the presence of a school on the beds or in their vicinity is discovered in time it can often be driven from the neighborhood by the use of explosives.

The principal enemy to the oyster on the Delaware beds is the drill or borer, a small marine snail which drills a hole through the oyster's shell and thus gains access to the contents, which it consumes. The perforation is made by actual drilling with a rasplike organ protruded from the mouth, and so far as is known no acid or other solvent is employed to soften the shell. The drill breeds during late spring and summer, laying its eggs in vase-shaped, leathery capsules attached in clusters to shells and other hard bodies on the bottom. These capsules, each containing several eggs, are readily recognizable, being about one-fourth inch long and usually yellow in color.

In the few places examined on the planted beds there were considerable numbers of drills and many small oysters killed by them. On the public beds near the east line some drills and killed oysters were found, but over most of the area surveyed the salinity of the water is somewhat too low to permit these pests ever to become a serious factor. Below a salinity represented approximately by a mixture of equal parts of salt and fresh water, having a specific gravity of about 1.012 or 1.013, the drill will not thrive.

Although in the absence of other food the drill will attach and sometimes kill oysters of marketable size, it invariably attacks smaller ones by preference. Seed oysters 2 or 2½ inches in diameter are comparatively immune, and in places where the drills are particularly troublesome such seed should be planted in preference to smaller. Although such is not known to be the case in Delaware, there are localities in which it is useless to plant shells or other cultch, as the spat is drilled before its shell has lost its first paperlike thinness.

The drill is a difficult enemy to combat. Where it is sufficiently abundant to be a menace on private beds the oysters are usually dredged up and the drills removed by hand and destroyed, after which the oysters are again laid down. Much can be done by destroying the drills and their egg capsules wherever found. The common practice of some Delaware planters of depositing rough seed on their beds undoubtedly helps to maintain the abundance of the drill.

# THE FISHERIES OF ALASKA IN 1910

By MILLARD C. MARSH
*Agent at the Salmon Fisheries of Alaska*
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Bureau of Fisheries Document No. 746

# CONTENTS.


| | Page. |
|---|---|
| Summarized statistics | 5 |
| Persons engaged | 5 |
| Investment | 6 |
| Products | 7 |
| The salmon industry | 11 |
| Hatcheries | 11 |
| Statistics | 12 |
| Catch | 12 |
| Canning | 15 |
| Canneries in operation | 17 |
| Pickling | 21 |
| Mild curing | 23 |
| Fresh salmon | 25 |
| Minor preserving processes | 25 |
| Return of marked salmon | 26 |
| Observations in Wood River region | 27 |
| Count of breeding run in Wood River | 28 |
| Significance of Wood River data | 33 |
| Explorations of Lake Aleknagik | 37 |
| The cod fishery | 37 |
| Shore stations | 38 |
| Statistics for central Alaska | 39 |
| Persons engaged | 39 |
| Investment | 39 |
| Products | 39 |
| Vessel fishing | 40 |
| The halibut fishery | 40 |
| Fishing grounds | 40 |
| Methods and conditions | 42 |
| Statistics | 44 |
| Persons engaged in the southeast Alaska halibut fisheries | 44 |
| Investment in the southeast Alaska halibut fisheries | 44 |
| Products of the southeast Alaska halibut fisheries | 45 |
| Puget Sound fishing fleet | 45 |
| The herring fishery | 45 |
| Abundance of fish | 45 |
| Uses for food and bait | 46 |
| The fertilizer question | 47 |
| Statistics | 50 |
| Persons engaged | 50 |
| Investment | 50 |
| Products | 51 |
| Fertilizer and oils | 51 |

Page
The crab fishery ..... 51
The whale fishery ..... 52
Furs ..... 53
Aquatic furs ..... 54
Beaver ..... 54
Muskrat ..... 55
Land otter ..... 55
Sea otter ..... 55
Fur seal ..... 56
Miscellaneous aquatic mammals ..... 58
Hair seals ..... 58
Walruses ..... 59
License taxes and hatchery rebates ..... 60
Complaints and prosecutions ..... 61
Proposed legislation ..... 63
Recommendations ..... 65
Appendix.—Fishery laws and regulations ..... 67
An act for the protection and regulation of the fisheries of Alaska ..... 67
An act to prohibit aliens from fishing in the waters of Alaska ..... 70
Fishery regulations ..... 71
Regulations for protection of fur-bearing animals ..... 71

# THE FISHERIES OF ALASKA IN 1910.

By Millard C. Marsh, *Agent at the Salmon Fisheries of Alaska,*
and
John N. Cobb, *Assistant Agent.*

## SUMMARIZED STATISTICS OF THE FISHERIES.

As in the similar reports for previous years, the District of Alaska is considered in the four geographic sections generally recognized, as follows: Southeast Alaska, embracing all that narrow strip of mainland and the numerous islands adjacent, from Portland Canal northwestward to and including Yakutat Bay; central Alaska, the region on the Pacific, or south side, from Yakutat Bay westward, including the Aleutian chain; western Alaska, the shores of Bering Sea and islands in this sea; and arctic Alaska, from Bering Strait to the Canadian border.

With the exception of arctic Alaska and a portion of central and western Alaska, practically all of the fishing localities were visited by one or the other of the two agents engaged in the inspection work this year. Considerable commercial fishing is carried on in the Yukon River and its tributaries, where fish wheels, nets, and spears are employed, but unfortunately it has been found impossible so far, owing to the short time available for the agents each season, to extend the inspection work over this large area, or to secure data showing the extent of the fisheries there. Owing to the impossibility of the agents visiting arctic Alaska in the limited open season, the data for this section are incomplete, but what have been secured are shown.

It has been found an impossibility to secure even approximate data as to the persons engaged or the investment in the hunting of aquatic animals (except fur seals and sea otters), which is general among the natives.

### PERSONS ENGAGED.

The number of persons engaged in the fisheries of Alaska in 1910 was 15,620, an increase of 3,032 over 1909. Of these 6,836 were whites, 4,147 Indians, 2,411 Chinese, 2,206 Japanese, 4 Koreans, and

16 Filipinos, as compared with 5,608 whites, 2,823 Indians, 1,998 Chinese, and 2,159 Japanese, in 1909, showing an increase in 1910 of 1,228 whites, 1,324 Indians, 413 Chinese, and 47 Japanese. The most gratifying feature is the large increase in the number of whites and Indians employed, as all of the Indians and many of the whites are permanent residents of the District. The fact that the fishermen act as sailors on the transporting vessels to and from the salmon canneries and salteries explains the small number of transporters shown in the table as compared with the large number of transporting vessels.

PERSONS ENGAGED IN THE ALASKA FISHERIES IN 1910.

| Occupation and race. | Southeast Alaska. | Central Alaska. | Western Alaska. | Arctic Alaska. | Total. |
|---|---|---|---|---|---|
| Fishermen: | | | | | |
| Vessel – | | | | | |
| Whites | 402 | 6 | | | 408 |
| Indians | 38 | 48 | | | 86 |
| Japanese | 4 | | | | 4 |
| Total | 444 | 54 | | | 498 |
| Shore – | | | | | |
| Whites | 1,149 | 737 | 1,589 | | 3,475 |
| Indians | 1,710 | 196 | 72 | 438 | 2,416 |
| Chinese | 10 | | 9 | | 19 |
| Japanese | 3 | | | | 3 |
| Total | 2,872 | 933 | 1,670 | 438 | 5,913 |
| Total fishermen | 3,316 | 987 | 1,670 | 438 | 6,411 |
| Shoresmen: | | | | | |
| Whites | 731 | 396 | 1,232 | 10 | 2,369 |
| Indians | 1,103 | 132 | 331 | | 1,566 |
| Chinese | 705 | 468 | 1,218 | | 2,391 |
| Japanese | 472 | 393 | 1,323 | | 2,188 |
| Koreans | | 4 | | | 4 |
| Filipinos | | | 16 | | 16 |
| Total | 3,011 | 1,393 | 4,120 | 10 | 8,534 |
| Transporters: | | | | | |
| Whites | 264 | 115 | 205 | | 584 |
| Indians | 69 | 10 | | | 79 |
| Chinese | | 1 | | | 1 |
| Japanese | 8 | 3 | | | 11 |
| Total | 341 | 129 | 205 | | 675 |
| Grand total | 6,668 | 2,509 | 5,995 | 448 | 15,620 |

## INVESTMENT.

The total investment in the fisheries is $20,711,422, an increase of $10,829,740, as compared with 1909. A considerable proportion of this increase is due to the showing of cash capital once more, this item having been eliminated for the first time in 1906. Nearly all forms of apparatus show increases as compared with 1909.

INVESTMENT IN THE ALASKA FISHERIES IN 1910.

| Items. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Arctic Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Fishing vessels: | | | | | | | | | | |
| Steamers and launches | 71 | $501,100 | ..... | ..... | ..... | ..... | ..... | ..... | 71 | $501,100 |
| Tonnage | 1,024 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,024 | ..... |
| Outfit | ..... | 177,049 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 177,049 |
| Sailing | 3 | 3,800 | 2 | $4,000 | ..... | ..... | ..... | ..... | 5 | 7,800 |
| Tonnage | 35 | ..... | 87 | ..... | ..... | ..... | ..... | ..... | 122 | ..... |
| Outfit | ..... | 875 | ..... | 1,300 | ..... | ..... | ..... | ..... | ..... | 2,175 |
| Transporting vessels: | | | | | | | | | | |
| Steamers and launches | 135 | 366,850 | 28 | 252,050 | 44 | $650,950 | ..... | ..... | 207 | 1,269,850 |
| Tonnage | 1,378 | ..... | 1,195 | ..... | 2,662 | ..... | ..... | ..... | 5,235 | ..... |
| Outfit | ..... | 210,800 | ..... | 77,900 | ..... | 109,600 | ..... | ..... | ..... | 398,300 |
| Sailing | 20 | 180,150 | 13 | 385,500 | 32 | 711,000 | ..... | ..... | 65 | 1,276,650 |
| Tonnage | 6,753 | ..... | 17,395 | ..... | 41,748 | ..... | ..... | ..... | 65,896 | ..... |
| Outfit | ..... | 33,200 | ..... | 22,000 | ..... | 48,000 | ..... | ..... | ..... | 103,200 |
| Steamers and launches (under 5 tons) | 240 | 401,030 | 12 | 26,225 | 7 | 18,200 | ..... | ..... | 259 | [a] 1 445,455 |
| Boats, sail and row | 1,090 | 59,648 | 570 | 33,880 | 845 | 186,840 | 82 | $13,300 | 2,587 | 293,668 |
| Scows and lighters | 142 | 67,183 | 111 | 58,300 | 130 | 107,529 | ..... | ..... | 383 | 233,012 |
| Pile drivers | 22 | 45,197 | 21 | 46,300 | 17 | 38,300 | ..... | ..... | 60 | 129,797 |
| Apparatus, vessel fisheries: | | | | | | | | | | |
| Purse seines | 10 | 3,995 | ..... | ..... | ..... | ..... | ..... | ..... | [b] 10 | 3,995 |
| Lines, trawl | ..... | 22,080 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 22,080 |
| Shotguns | ..... | ..... | 48 | 476 | ..... | ..... | ..... | ..... | 48 | 476 |
| Whaling gear | ..... | 1,015 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1,015 |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Haul seines | 48 | 9,797 | 56 | 21,285 | ..... | ..... | ..... | ..... | [c] 104 | 31,082 |
| Purse seines | 152 | 43,079 | ..... | ..... | ..... | ..... | ..... | ..... | [d] 152 | 43,079 |
| Gill nets | 416 | 58,659 | 132 | 17,295 | 903 | 90,682 | ..... | ..... | [e] 1,451 | 166,636 |
| Dip nets | 13 | 123 | 18 | 9 | ..... | ..... | ..... | ..... | 31 | 132 |
| Lines, hand | ..... | 521 | ..... | 1,245 | ..... | ..... | ..... | ..... | ..... | 1,766 |
| Lines, trawl | ..... | 15,870 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 15,870 |
| Traps, stake | 41 | 109,550 | 38 | 51,162 | 14 | 19,500 | ..... | ..... | 93 | 180,212 |
| Traps, floating | 13 | 22,728 | 1 | 1,500 | ..... | ..... | ..... | ..... | 14 | 24,228 |
| Crab pots | 366 | 1,082 | ..... | ..... | ..... | ..... | ..... | ..... | 366 | 1,082 |
| Spears | 120 | 115 | ..... | ..... | ..... | ..... | ..... | ..... | 120 | 115 |
| Hoes | 14 | 10 | 5 | 4 | ..... | ..... | ..... | ..... | 19 | 14 |
| Shotguns | 40 | 1,200 | ..... | ..... | ..... | ..... | ..... | ..... | 40 | 1,200 |
| Whaling gear | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 18,450 | ..... | 18,450 |
| Cash capital | ..... | 3,544,333 | ..... | 1,593,444 | ..... | 3,456,660 | ..... | 10,000 | ..... | 8,604,437 |
| Shore and accessory property | ..... | 2,376,584 | ..... | 1,346,405 | ..... | 3,030,008 | ..... | 4,500 | ..... | 6,757,497 |
| Total | ..... | 8,257,623 | ..... | 3,940,280 | ..... | 8,485,706 | ..... | 46,250 | ..... | 20,711,422 |

[a] Includes outfit.
[b] Aggregate length of 3,280 yards.
[c] Aggregate length of 36,190 yards.
[d] Aggregate length of 59,030 yards.
[e] Aggregate length of 412,176 yards.

## PRODUCTS.

The total quantity of products was 214,536,433 pounds, valued at $13,259,859, an increase of 12,553,195 pounds and $2,078,471 over 1909. Except for salmon bellies and backs, fertilizer, oil, furs, and hides, the weights are round weights, or the weights of products when first taken from the water; for weights of prepared products the reader is referred to the subsidiary tables of the report. As the packing establishments almost invariably catch their own fish, it has been found practically impossible to show the value of the products as they leave the fishermen's hands, hence the values shown are for the prepared products.

## Products of Alaska Fisheries in 1910.

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Black cod: | | | | | | |
| Fresh | 13,800 | $572 | | | | |
| Frozen | 10,172 | 326 | | | | |
| Pickled | 72,673 | 1,934 | | | | |
| Cod: | | | | | | |
| Fresh | 6,000 | 300 | 16,000 | $560 | | |
| Pickled | | | 125,866 | 3,320 | | |
| Dry-salted | | | 2,877,157 | 59,433 | | |
| Tongues, pickled | | | 3,600 | 130 | | |
| Eulachon: | | | | | | |
| Fresh | 2,600 | 104 | | | | |
| Pickled | 40,000 | 1,200 | | | | |
| Smoked | 600 | 36 | | | | |
| Flounders, or sole | 5,000 | 150 | | | | |
| Halibut: | | | | | | |
| Fresh | 19,038,001 | 731,914 | 51,000 | 2,040 | | |
| Frozen | 2,467,125 | 73,548 | | | | |
| Fletched | 73,893 | 2,534 | | | | |
| Pickled | 270 | 14 | | | | |
| Herring: | | | | | | |
| Fresh | 574,359 | 5,203 | 10,000 | 300 | | |
| Frozen | 522,500 | 5,225 | | | | |
| Pickled | 731,560 | 12,255 | 60,480 | 1,728 | | |
| Dry-salted | 45,600 | 954 | | | | |
| Eggs, dried | 1,000 | 100 | | | | |
| Pollock | | | 1,800 | 90 | | |
| Redfish, or black bass | 19,100 | 960 | 8,000 | 400 | | |
| Rock cod: | | | | | | |
| Fresh | 22,000 | 1,080 | 11,000 | 440 | | |
| Pickled | 160 | 7 | | | | |
| Salmon: | | | | | | |
| Fresh— | | | | | | |
| Coho, or silver | 52,588 | 2,419 | 7,500 | 225 | | |
| Humpback, or pink | 24,000 | 300 | | | | |
| King, or spring | 977,348 | 45,770 | | | | |
| Red, or sockeye | 77,577 | 4,378 | 28,000 | 840 | | |
| Frozen— | | | | | | |
| Coho, or silver | 97,529 | 3,889 | | | | |
| Dog, or chum | 17,337 | 695 | | | | |
| King, or spring | 38,576 | 1,235 | | | | |
| Canned— | | | | | | |
| Coho, or silver | 5,841,990 | 404,907 | 1,394,960 | 99,103 | 814,870 | $55,656 |
| Dog, or chum | 16,221,450 | 703,555 | 9,170 | 403 | 1,564,640 | 69,451 |
| Humpback, or pink | 34,382,285 | 1,565,358 | 2,225,790 | 101,380 | 2,194,360 | 97,317 |
| King, or spring | 24,360 | 1,998 | 1,105,020 | 85,235 | 1,686,090 | 127,569 |
| Red, or sockeye | 18,247,740 | 1,466,918 | 25,541,250 | 1,959,539 | 57,729,700 | 4,347,933 |
| Mild-cured— | | | | | | |
| King, or spring | 3,824,900 | 218,441 | 35,650 | 2,232 | | |
| Pickled— | | | | | | |
| Coho, or silver | 9,450 | 296 | 33,750 | 1,208 | | |
| Humpback, or pink | 84,780 | 1,905 | 3,510 | 78 | 810 | 15 |
| King, or spring | | | | | 95,040 | 3,399 |
| King, or spring, fins | 400 | 24 | | | | |
| Red, or sockeye | 540 | 20 | 400,950 | 12,278 | 2,819,880 | 92,351 |
| Red, or sockeye, tips | | | | | 800 | 60 |
| Dry-salted— | | | | | | |
| Coho, or silver, backs | | | 10,000 | 290 | | |
| Dog, or chum | 29,570 | 554 | | | | |
| King, or spring | 9,600 | 288 | | | | |
| Humpback, or pink, backs | 21,800 | 278 | 1,500 | 25 | | |
| Red, or sockeye, backs | | | 17,000 | 410 | | |
| Smoked— | | | | | | |
| Coho, or silver, backs | | | 2,000 | 200 | | |
| Dog, or chum | 410 | 60 | | | | |
| Humpback, or pink, backs | 100 | 5 | | | | |
| Red, or sockeye, backs | | | 16,058 | 1,608 | | |
| Salmon bellies, pickled: | | | | | | |
| Coho, or silver | | | 25,200 | 1,135 | | |
| Dog, or chum | 14,000 | 770 | | | | |
| Humpback, or pink | 84,200 | 4,410 | 39,000 | 1,725 | | |
| King, or spirng | 1,200 | 128 | | | | |
| Red, or sockeye | 600 | 24 | 161,000 | 10,815 | | |
| Smelt | 4,085 | 205 | | | | |
| Tomcod | 800 | 32 | | | | |

PRODUCTS OF ALASKA FISHERIES IN 1910—Continued.

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Trout: | | | | | | |
| Cutthroat | 1,000 | $50 | | | | |
| Dolly Varden, or salmon trout— | | | | | | |
| Fresh | 50,000 | 2,000 | 15,000 | $750 | | |
| Canned | | | 13,510 | 618 | | |
| Pickled | 1,000 | 50 | | | | |
| Rainbow | 7,100 | 284 | | | | |
| Steelhead— | | | | | | |
| Fresh | 3,800 | 168 | | | | |
| Frozen | 19,215 | 1,153 | | | | |
| Fertilizer: | | | | | | |
| Herring | 2,617,000 | 40,000 | | | | |
| Whale | 869,141 | 16,456 | | | | |
| Oil: | | | | | | |
| Herring | 2,077,500 | 55,000 | | | | |
| Shark | 165 | 10 | | | | |
| Whale | 2,744,480 | 117,270 | | | | |
| Abalone shells | 70 | 30 | | | | |
| Clams | 6,880 | 430 | 3,200 | 120 | | |
| Crabs | 116,904 | 4,902 | 32,000 | 2,400 | | |
| Seaweed | 2,000 | 300 | | | | |
| Aquatic furs and skins: | | | | | | |
| Beaver | 368 | 1,922 | 608 | 2,763 | 1,026 | $5,883 |
| Castoreum | | | 11 | 59 | 52 | 160 |
| Muskrat | 1,592 | 5,086 | 560 | 917 | 25,834 | 69,245 |
| Otter— | | | | | | |
| Land | 1,232 | 5,213 | 1,117 | 4,493 | 2,302 | 8,843 |
| Sea | 15 | 600 | 120 | 5,900 | 20 | 670 |
| Sea, pups | | | 3 | 5 | 6 | 32 |
| Seal— | | | | | | |
| Fur | 828 | 4,207 | | | 85,476 | 468,042 |
| Fur, unborn | | | | | 242 | 12 |
| Hair | 2,790 | 796 | | | 871 | 150 |
| Walrus ivory | 80 | 85 | | | | |
| Whale products: | | | | | | |
| Bones, unground | 400,000 | 4,500 | | | | |
| Bones, ground | 395,000 | 4,789 | | | | |
| Stearin | 114,711 | 5,249 | | | | |
| Whalebone, or baleen | 55,025 | 4,805 | | | | |
| Total | 113,223,554 | 5,542,633 | 34,288,340 | 2,365,195 | 67,022,019 | 5,346,788 |

| Products. | Arctic Alaska. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Black cod: | | | | |
| Fresh | | | 13,800 | $572 |
| Frozen | | | 10,172 | 326 |
| Pickled | | | 72,673 | 1,934 |
| Cod: | | | | |
| Fresh | | | 22,000 | 860 |
| Pickled | | | 125,866 | 3,320 |
| Dry-salted | | | 2,877,157 | 59,433 |
| Tongues, pickled | | | 3,600 | 130 |
| Eulachon: | | | | |
| Fresh | | | 2,600 | 104 |
| Pickled | | | 40,000 | 1,200 |
| Smoked | | | 600 | 36 |
| Flounders, or sole | | | 5,000 | 150 |
| Halibut: | | | | |
| Fresh | | | 19,089,001 | 733,954 |
| Frozen | | | 2,467,125 | 73,548 |
| Fletched | | | 73,893 | 2,534 |
| Pickled | | | 270 | 14 |
| Herring: | | | | |
| Fresh | | | 584,359 | 5,503 |
| Frozen | | | 522,500 | 5,225 |
| Pickled | | | 792,040 | 13,983 |
| Dry-salted | | | 45,600 | 954 |
| Eggs, dried | | | 1,000 | 100 |
| Pollock | | | 1,800 | 90 |
| Redfish, or black bass | | | 27,100 | 1,360 |

PRODUCTS OF ALASKA FISHERIES IN 1910—Continued.

| Products. | Arctic Alaska. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Rock cod: | | | | |
| Fresh | | | 33,000 | $1,520 |
| Pickled | | | 160 | 7 |
| Salmon: | | | | |
| Fresh— | | | | |
| Coho, or silver | | | 60,088 | 2,644 |
| Humpback, or pink | | | 24,009 | 300 |
| King, or spring | | | 977,348 | 45,770 |
| Red, or sockeye | | | 105,577 | 5,218 |
| Frozen— | | | | |
| Coho, or silver | | | 97,529 | 3,889 |
| Dog, or chum | | | 17,337 | 695 |
| King, or spring | | | 38,576 | 1,235 |
| Canned— | | | | |
| Coho, or silver | | | 8,051,820 | 559,666 |
| Dog, or chum | | | 17,795,260 | 773,409 |
| Humpback, or pink | | | 38,802,435 | 1,764,055 |
| King, or spring | | | 2,815,470 | 214,802 |
| Red, or sockeye | | | 101,518,690 | 7,774,390 |
| Mild-cured— | | | | |
| King, or spring | | | 3,860,550 | 220,673 |
| Pickled— | | | | |
| Coho, or silver | | | 43,200 | 1,504 |
| Humpback, or pink | | | 89,100 | 1,998 |
| King, or spring | | | 95,040 | 3,399 |
| King, or spring, fins | | | 400 | 24 |
| Red, or sockeye | | | 3,221,370 | 104,649 |
| Red, or sockeye, tips | | | 800 | 60 |
| Dry-salted— | | | | |
| Coho, or silver, backs | | | 10,000 | 290 |
| Dog, or chum | | | 29,570 | 554 |
| King, or spring | | | 9,600 | 288 |
| Humpback, or pink, backs | | | 23,300 | 303 |
| Red, or sockeye, backs | | | 17,000 | 410 |
| Smoked— | | | | |
| Coho, or silver, backs | | | 2,000 | 200 |
| Dog, or chum | | | 440 | 60 |
| Humpback, or pink, backs | | | 100 | 5 |
| Red, or sockeye, backs | | | 16,058 | 1,608 |
| Salmon bellies, pickled: | | | | |
| Coho, or silver | | | 25,200 | 1,135 |
| Dog, or chum | | | 14,000 | 770 |
| Humpback, or pink | | | 123,200 | 6,135 |
| King, or spring | | | 1,200 | 128 |
| Red, or sockeye | | | 161,600 | 10,839 |
| Smelt | | | 4,085 | 205 |
| Tomcod | | | 800 | 32 |
| Trout: | | | | |
| Cutthroat | | | 1,000 | 50 |
| Dolly Varden, or salmon trout— | | | | |
| Fresh | | | 65,000 | 2,750 |
| Canned | | | 13,510 | 618 |
| Pickled | | | 1,000 | 50 |
| Rainbow | | | 7,100 | 284 |
| Steelhead— | | | | |
| Fresh | | | 3,800 | 168 |
| Frozen | | | 19,215 | 1,153 |
| Fertilizer: | | | | |
| Herring | | | 2,617,000 | 40,000 |
| Whale | | | 869,141 | 16,456 |
| Oil: | | | | |
| Herring | | | [a] 2,077,500 | 55,000 |
| Shark | | | [b] 165 | 10 |
| Whale | | | [c] 2,744,480 | 117,270 |
| Abalone shells | | | 70 | 30 |
| Clams | | | [d] 10,080 | 550 |
| Crabs | | | [e] 148,904 | 7,302 |
| Seaweed | | | 2,000 | 300 |
| Aquatic furs and skins: | | | | |
| Beaver | | | [f] 2,002 | 10,568 |
| Castoreum | | | 63 | 219 |
| Muskrat | | | [g] 27,986 | 75,248 |

[a] Represents 277,000 gallons.
[b] Represents 22 gallons.
[c] Represents 369,930 gallons.
[d] Represents 1,260 bushels.
[e] Represents 70,452 crabs.
[f] Represents 2,002 skins.
[g] Represesnt 223,893 skins.

PRODUCTS OF ALASKA FISHERIES IN 1910—Continued.

| Products. | Arctic Alaska. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Aquatic furs and skins—Continued. | | | | |
| Otter— | | | | |
| Land | | | [a] 4,651 | $18,549 |
| Sea | | | [b] 155 | 7,170 |
| Sea, pups | | | [c] 9 | 37 |
| Seal— | | | | |
| Fur | | | [d] 86,304 | 472,249 |
| Fur, unborn | | | [e] 242 | 12 |
| Hair | | | [f] 3,661 | 946 |
| Walrus ivory | 186 | $186 | 266 | 271 |
| Whale products: | | | | |
| Bones, unground | | | 400,000 | 4,500 |
| Bones, ground | | | 395,000 | 4,789 |
| Stearin | | | 114,711 | 5,249 |
| Whalebone, or baleen | 2,334 | 5,057 | 57,359 | 9,862 |
| Total | 2,520 | 5,243 | 214,536,433 | 13,259,859 |

[a] Represents 1,861 skins.
[b] Represents 31 skins.
[c] Represents 3 skins.
[d] Represents 14,384 skins (of these, 660 skins were from a seized Japanese schooner).
[e] Represents 121 skins (these were from a seized Japanese schooner).
[f] Represents 1,221 skins.

## THE SALMON INDUSTRY.

The run of salmon was very good in all sections except western Alaska. For a time the outlook was bad in southeast Alaska owing to the excessive rains which prevailed during the first half of the season, causing the salmon to rush up the streams, but an exceptionally dry spell lasting six weeks followed, which made the streams quite low and kept the fish from going up too rapidly. As a result the fisherman were enabled to make large catches during this period.

### HATCHERIES.

Seven salmon hatcheries were operated during the season of 1909–10, as follows:

SALMON HATCHERIES OPERATED IN 1910.

| Name. | Location. | Owner and operator. |
|---|---|---|
| Yes Lake | Yes Lake | United States Bureau of Fisheries. |
| Afognak | Afognak Island | Do. |
| Fortmann | Naha Stream | Alaska Packers Association. |
| Karluk | Karluk River | Do. |
| Klawak | Klawak Lake | North Pacific Trading and Packing Co., and North Alaska Salmon Co. |
| Hetta | Hetta Lake | Northwestern Fisheries Co. |
| Quadra | Quadra Lake | Do. |

The Alaska Packers Association reports as follows on a subject of interest to fish culturists:

We have been quite successful in retaining the fry in our nursery ponds [at Fortmann hatchery] for a definite period and feeding them on fresh steelheads macerated

to a pulp. In two ponds containing about 10,000,000 fry, from 30 to 40 pounds of this food was fed each day, and they appeared to thrive wonderfully well upon it, as scarcely any dead fry were found.

The rainfall was 160.80 inches and the snowfall 289 inches for the year ended June 30, 1910, at Fortmann hatchery; which record will give a slight idea of the weather conditions with which the superintendents of hatcheries in Alaska have to contend. Despite the adverse weather conditions, however, all of the hatcheries except Fortmann and Afognak operated at full capacity, and taken as a whole the season was a fairly successful one.

The Klawak Lake hatchery of the North Pacific Trading & Packing Co. was enlarged the present summer so that it is now able to handle 10,000,000 eggs.

At the dam on the stream leading to Capt. John C. Callbreath's hatchery on McHenry Inlet a man has been stationed each year since the hatchery was shut down, for the purpose of lifting the salmon over the structure. In 1908, 1,022 males and 876 females were put over, and in 1909, 516 males and 434 females.

OUTPUT OF THE SALMON HATCHERIES OF ALASKA.

| Hatcheries. | Year ended June 30, 1910. [a] | | | | Eggs taken 1910–11. | |
|---|---|---|---|---|---|---|
| | Red, or sockeye. | | Humpback, or pink. | | Red, or sockeye. | Humpback, or pink. |
| | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | | |
| Yes Lake | [b] 72,005,000 | 69,879,600 | ..... | ..... | 72,000,000 | 114,000 |
| Afognak | 76,020,000 | 68,422,170 | 499,400 | 363,740 | 30,725,000 | 405,000 |
| Fortmann | 53,340,000 | 50,725,000 | ..... | ..... | 34,920,000 | ..... |
| Karluk | 45,228,000 | 40,620,000 | ..... | ..... | 49,626,000 | ..... |
| Klawak | [c] | 5,300,000 | ..... | ..... | [c] | ..... |
| Hetta | 10,313,000 | 9,000,000 | ..... | ..... | 9,141,000 | ..... |
| Quadra | 10,863,000 | 9,850,000 | ..... | ..... | 11,200,000 | ..... |
| Total | ..... | 253,796,770 | 499,400 | 363,740 | 9,141,000 | 519,000 |

[a] In three instances fry were held until July, 1910, and in order to make the record for the season complete these have been included.
[b] Of these, 5,000 were reported as coho eggs.
[c] No report.

## STATISTICS.

### CATCH IN 1907, 1908, 1909, AND 1910.

Following is a table showing, for the geographic sections, by apparatus and species and by species alone, the number of salmon caught in the years 1907, 1908, 1909, and 1910. All species, except red salmon, show increases over 1909. The total catch in 1910 is smaller than in any of the other years shown.

## Catch of Salmon in Alaska in 1907, 1908, 1909, and 1910, by Sections, Species, and Apparatus.

| Apparatus and species. | 1907 | 1908 | 1909 | 1910 |
|---|---|---|---|---|
| SOUTHEAST ALASKA. | | | | |
| Seines: | | | | |
| Coho, or silver | 302,963 | 273,993 | 165,177 | 322,521 |
| Dog, or chum | 1,101,822 | 1,378,339 | 387,774 | 1,566,221 |
| Humpback, or pink | 8,614,551 | 8,900,467 | 5,572,005 | 6,228,732 |
| King, or spring | 259 | 1,812 | 293 | 152 |
| Red, or sockeye | 1,419,221 | 1,691,149 | 1,285,265 | 1,481,898 |
| Total | 11,438,816 | 12,245,760 | 7,410,514 | 9,599,522 |
| Traps: | | | | |
| Coho, or silver | 139,783 | 119,034 | 112,213 | 165,023 |
| Dog, or chum | 158,170 | 368,709 | 337,395 | 437,726 |
| Humpback, or pink | 3,438,335 | 5,102,843 | 3,628,940 | 3,151,684 |
| King, or spring | 26,835 | 3,448 | 5,107 | 2,546 |
| Red, or sockeye | 615,684 | 486,646 | 893,816 | 860,737 |
| Total | 4,378,807 | 6,080,680 | 4,977,471 | 4,617,716 |
| Gill nets: | | | | |
| Coho, or silver | 83,943 | 84,176 | 78,845 | 164,990 |
| Dog, or chum | 74,298 | 56,431 | 9,041 | 28,802 |
| Humpback, or pink | 18,029 | 59,582 | 127,422 | 32,357 |
| King, or spring | 70,388 | 64,148 | 68,659 | 51,667 |
| Red, or sockeye | 214,442 | 378,834 | 478,398 | 574,251 |
| Total | 461,100 | 643,171 | 762,365 | 852,067 |
| Lines: | | | | |
| Coho, or silver | 1,052 | 1,329 | 8,000 | 6,000 |
| King, or spring | 23,082 | 61,633 | 134,606 | 204,823 |
| Total | 24,134 | 62,962 | 142,606 | 210,823 |
| Spears: | | | | |
| Red, or sockeye | 20,000 | 4,000 | 45,400 | 70,000 |
| Wheels: | | | | |
| King, or spring | ..... | 27 | ..... | ..... |
| Total: | | | | |
| Coho, or silver | 527,741 | 478,532 | 364,235 | 658,534 |
| Dog, or chum | 1,334,290 | 1,803,479 | 734,210 | 2,032,749 |
| Humpback or pink | 12,070,915 | 14,062,892 | 9,328,367 | 9,412,773 |
| King, or spring | 120,564 | 131,068 | 208,665 | 259,188 |
| Red, or sockeye | 2,269,347 | 2,560,629 | 2,702,879 | 2,986,886 |
| Grand total | 16,322,857 | 19,036,600 | 13,338,356 | 15,350,130 |
| CENTRAL ALASKA. | | | | |
| Seines: | | | | |
| Coho, or silver | 48,759 | 60,847 | 52,258 | 64,202 |
| Humpback, or pink | 252,373 | 268,466 | 127,549 | 375,041 |
| King, or spring | 4,015 | 3,028 | 3,907 | 1,598 |
| Red, or sockeye | 3,568,069 | 2,709,750 | 2,038,833 | 2,227,803 |
| Total | 3,873,216 | 3,042,091 | 2,222,547 | 2,668,644 |
| Traps: | | | | |
| Coho, or silver | 163,076 | 90,616 | 89,918 | 115,922 |
| Dog, or chum | ..... | ..... | ..... | 1,318 |
| Humpback, or pink | 6,420 | 375,140 | 3,740 | 273,023 |
| King, or spring | 36,791 | 17,216 | 44,632 | 34,007 |
| Red, or sockeye | 2,711,142 | 2,285,401 | 2,152,555 | 2,095,563 |
| Total | 2,917,429 | 2,768,373 | 2,290,845 | 2,519,833 |
| Gill nets: | | | | |
| Coho, or silver | 15,000 | ..... | ..... | 18,826 |
| King, or spring | 27,022 | 18,351 | 18,059 | 15,995 |
| Red, or sockeye | 358,649 | 512,464 | 487,984 | 298,915 |
| Total | 400,671 | 530,815 | 506,043 | 333,736 |
| Total: | | | | |
| Coho, or silver | 226,835 | 151,463 | 142,176 | 198,950 |
| Dog, or chum | ..... | ..... | ..... | 1,318 |
| Humpback, or pink | 258,793 | 643,606 | 131,289 | 648,064 |
| King, or spring | 67,828 | 38,595 | 66,598 | 51,600 |
| Red, or sockeye | 6,637,860 | 5,507,615 | 4,679,372 | 4,622,281 |
| Grand total | 7,191,316 | 6,341,279 | 5,019,435 | 5,522,213 |

CATCH OF SALMON IN ALASKA IN 1907, 1908, 1909, AND 1910, BY SECTIONS, SPECIES, AND APPARATUS—Continued.

| Apparatus and species. | 1907 | 1908 | 1909 | 1910 |
|---|---|---|---|---|
| WESTERN ALASKA. | | | | |
| Traps: | | | | |
| Coho, or silver | 29,199 | 20,000 | 9,930 | 6,340 |
| Dog, or chum | 36,141 | 114,534 | 101,456 | 58,039 |
| Humpback, or pink | 1,500 | 261,519 | 15 | 513,072 |
| King, or spring | 5,011 | 4,856 | 3,096 | 4,382 |
| Red, or sockeye | 1,078,869 | 860,516 | 508,011 | 326,833 |
| Total | 1,150,720 | 1,261,425 | 622,508 | 908,666 |
| Gill nets: | | | | |
| Coho, or silver | 109,650 | 86,088 | 71,393 | 132,860 |
| Dog, or chum | 472,586 | 340,309 | 346,340 | 252,179 |
| Humpback, or pink | 337,514 | 138,138 | 31,811 | 149,057 |
| King, or spring | 134,391 | 87,174 | 128,893 | 97,373 |
| Red, or sockeye | 9,181,034 | 16,013,966 | 15,133,872 | 11,266,776 |
| Total | 10,235,175 | 16,665,675 | 15,712,309 | 11,898,245 |
| Total: | | | | |
| Coho, or silver | 138,849 | 106,088 | 81,323 | 139,200 |
| Dog, or chum | 508,727 | 454,843 | 447,796 | 310,218 |
| Humpback, or pink | 339,014 | 399,657 | 31,826 | 662,129 |
| King, or spring | 139,402 | 92,030 | 131,989 | 101,755 |
| Red, or sockeye | 10,259,903 | 16,874,482 | 15,641,883 | 11,593,609 |
| Grand total | 11,385,895 | 17,927,100 | 16,334,817 | 12,806,911 |
| TOTAL. | | | | |
| Seines: | | | | |
| Coho, or silver | 351,722 | 334,840 | 217,435 | 386,723 |
| Dog, or chum | 1,101,822 | 1,378,339 | 387,774 | 1,566,221 |
| Humpback, or pink | 8,866,924 | 9,168,933 | 5,699,554 | 6,603,773 |
| King, or spring | 4,274 | 4,840 | 4,200 | 1,750 |
| Red, or sockeye | 4,987,290 | 4,400,899 | 3,324,098 | 3,709,701 |
| Total | 15,312,032 | 15,287,851 | 9,633,061 | 12,268,168 |
| Traps: | | | | |
| Coho, or silver | 332,058 | 229,650 | 212,061 | 287,285 |
| Dog, or chum | 194,311 | 483,243 | 438,851 | 497,083 |
| Humpback, or pink | 3,446,255 | 5,739,502 | 3,632,695 | 3,937,779 |
| King, or spring | 68,637 | 25,520 | 52,835 | 40,935 |
| Red, or sockeye | 4,405,695 | 3,632,563 | 3,584,382 | 3,283,133 |
| Total | 8,446,956 | 10,110,478 | 7,920,824 | 8,046,215 |
| Gill nets: | | | | |
| Coho, or silver | 208,593 | 170,264 | 150,238 | 316,676 |
| Dog, or chum | 546,884 | 396,740 | 355,381 | 280,981 |
| Humpback, or pink | 355,543 | 197,720 | 159,233 | 181,414 |
| King, or spring | 231,801 | 169,673 | 215,611 | 165,035 |
| Red, or sockeye | 9,754,125 | 16,905,264 | 16,070,254 | 12,139,942 |
| Total | 11,096,946 | 17,839,661 | 16,950,717 | 13,084,048 |
| Lines: | | | | |
| Coho, or silver | 1,052 | 1,329 | 8,000 | 6,000 |
| King, or spring | 23,082 | 61,633 | 134,606 | 204,823 |
| Total | 24,134 | 62,962 | 142,606 | 210,823 |
| Spears: | | | | |
| Red, or sockeye | 20,000 | 4,000 | 45,400 | 70,000 |
| Wheels: | | | | |
| King, or spring | ..... | 27 | ..... | ..... |
| Total: | | | | |
| Coho, or silver | 893,425 | 736,083 | 587,734 | 996,684 |
| Dog, or chum | 1,843,017 | 2,258,322 | 1,182,006 | 2,344,285 |
| Humpback, or pink | 12,668,722 | 15,106,155 | 9,491,482 | 10,722,966 |
| King, or spring | 327,794 | 261,693 | 407,252 | 412,543 |
| Red, or sockeye | 19,167,110 | 24,942,726 | 23,024,134 | 19,202,776 |
| Grand total | 34,900,068 | 43,304,979 | 34,692,608 | 33,679,254 |

NUMBER AND GROSS WEIGHT OF EACH SPECIES OF SALMON CAUGHT IN 1907, 1908, 1909, AND 1910.

| Species. | 1907 | | 1908 | |
|---|---|---|---|---|
| | *Number.* | *Pounds.* | *Number.* | *Pounds.* |
| Coho, or silver | 893,425 | 5,360,550 | 736,083 | 4,416,498 |
| Dog, or chum | 1,843,017 | 14,744,136 | 2,258,322 | 18,066,576 |
| Humpback, or pink | 12,668,722 | 50,674,888 | 15,106,155 | 60,424,620 |
| King, or spring | 327,794 | 7,211,468 | 261,693 | 5,757,246 |
| Red, or sockeye | 19,167,110 | 95,835,550 | 24,942,726 | 124,713,630 |
| Total | 34,900,068 | 173,826,592 | 43,304,979 | 213,378,570 |

| Species. | 1909 | | 1910 | |
|---|---|---|---|---|
| | *Number.* | *Pounds.* | *Number.* | *Pounds.* |
| Coho, or silver | 587,734 | 3,526,404 | 996,684 | 5,980,104 |
| Dog, or chum | 1,182,006 | 9,456,048 | 2,344,285 | 18,754,280 |
| Humpback, or pink | 9,491,482 | 37,965,928 | 10,722,966 | 42,891,864 |
| King, or spring | 407,252 | 8,959,544 | 412,543 | 9,075,946 |
| Red, or sockeye | 23,024,134 | 115,120,670 | 19,202,776 | 96,013,880 |
| Total | 34,692,608 | 175,028,594 | 33,679,254 | 172,716,074 |

## CANNING.

When the season of 1909 opened, all grades of salmon, except pinks and chums, were commanding remunerative prices. The prices of these two grades began to crumble in 1908 and kept on dropping through 1909, until finally they reached bottom at $2.40 per case for pinks (a drop of $1.05 per case from the 1907 prices) and $2.28 per case for chums (a drop of 96 cents per case from the 1907 prices). The demand for pink and chum salmon began to fall off in 1907, despite which the packers kept on piling up stock during the next two years, with the result that they became a drug on the market, and for a time it was difficult to move them, even at the above unremunerative prices. Late in 1909 the demand began to improve, and when the season of 1910 opened but few pinks and chums were left in first hands.

Early in the season rumors began to circulate that prices on all grades would be advanced, and the buyers, who had been content to buy only for immediate necessities as long as prices seemed to be crumbling, now came into the market with orders for large stocks. As a result, the packers soon were obliged to prorate the orders, as the pack did not begin to equal the demand. The expected high prices were realized, and before the pack had come out of Alaska it was all sold at the most remunerative figures realized by the packers in years.

In 1909, owing to the expected quadrennial heavy run of sockeye salmon on Puget Sound, the canneries of Gorman & Co., at Kasaan, of the Astoria & Puget Sound Packing Co., in Excursion Inlet, and of the Fidalgo Island Packing Co., at Ketchikan, all in southeast

Alaska, were shut down, as these companies felt it would be more profitable to devote all their energies to their Puget Sound plants. In 1910 all were operated. In addition new canneries were opened by the St. Elias Packing Co., at Alsek, in southeast Alaska, by the Northwestern Fisheries Co., at Kenai, on Cook Inlet (succeeding the mild-curing plant formerly operated by the San Juan Fishing & Packing Co.), and by the Columbia River Packers Association, at Chignik, in central Alaska. The cannery of the Alaska Salmon Co., on Wood River, western Alaska, which was closed down in 1909, owing to the loss of its supply ship, was operated this year.

New canneries which will likely be finished in time to operate in 1911 are the Hawk Fishing Co., at Hawk Inlet, Tee Harbor Packing Company, at Tee Harbor, southeast Alaska, and the Alaska Packers Association, at Naknek, western Alaska. For some years the Alaska Packers Association has operated two canneries at Karluk, on Kodiak Island. Karluk has no harbor, except for boats drawing less than 4 feet of water, and the association, fearing a repetition of the disaster of 1907, when the bark *Servia*, with a full cargo of salmon, was driven ashore in a gale and totally destroyed, began in 1909 the erection of a new cannery at Larsen Bay, a well-sheltered spot near by. This establishment will operate in 1911, the two Karluk canneries being held in reserve. Fishing will be carried on as usual at Karluk, the fish being transported to the new cannery. C. A. Burckhardt & Co., who now operate two canneries in southeast Alaska, have bought the saltery formerly owned by Mrs. A. E. King, at Sunny Point, southeast Alaska, and will convert this into a one-line cannery. The Alaska Fishermen's Packing Co. have purchased the Nelson, Olsen & Co. saltery in Kvichak Bay, western Alaska, and will replace the old plant by a one-line cannery. Several canneries are also engaged in making, or are contemplating, extensive changes to and enlargements of their present plants.

On August 10 the cannery of the Alaska-Portland Packers' Association, at Snag Point, Nushagak Bay, was completely destroyed by fire. The warehouse alongside, with much of the gill-netting and all of the trap web, together with part of the season's pack, was also consumed. The bunk houses, store, office, and residence, and the floating property, were saved. The property loss was about $200,000, partly covered by insurance. The company will rebuild next spring and hopes to have the cannery completed in time to operate that season.

On the night of September 12 fire broke out in the cannery of Gorman & Co., at Kasaan, in southeast Alaska, and resulted in the total destruction of the cannery, warehouse, store, hotel, and part of the season's pack. The company will erect a new cannery in time to operate next season.

Several canneries packed some thousands of cases of salmon in the new seamless or sanitary can with such success that it is probably a question of but a few seasons until this will be the only form of can in use in Alaska.

The two cannery fires resulted in the loss of the following cases of salmon:

| | Cases. |
|---|---|
| Cohos, 1-pound tall | 1,552 |
| Chums, 1-pound tall | 4,896 |
| Pinks, ½-pound flat | 141 |
| Pinks, 1-pound tall | 11,956 |
| Reds, 1-pound tall | 22,178 |
| Total | 40,723 |

These have been included in the statistical tables, as they had passed through all the stages of packing and were eventually paid for by the insurance companies.

## CANNERIES IN OPERATION.

Following is a list of the canneries operated during the season of 1910:

| Name. | Location. |
|---|---|
| Southeast Alaska: | |
| John L. Carlson & Co. | Taku Harbor. |
| George T. Myers & Co. | Sitkoh Bay. |
| Yakutat & Southern Railway Co. | Yakutat. |
| Astoria & Puget Sound Canning Co. | Excursion Inlet. |
| Pacific American Fisheries. | Do. |
| Northwestern Fisheries Co. | Dundas Bay, Quadra Bay, Santa Ana, Hunter Bay. |
| North Pacific Trading & Packing Co. | Klawak. |
| Fidalgo Island Packing Co. | Ketchikan. |
| Shakan Salmon Co. | Shakan. |
| Gorman & Co. | Kasaan. |
| F. C. Barnes Co. (Inc.) | Lake Bay. |
| Thlinket Packing Co. | Funter Bay. |
| Alaska Packers Association. | Loring and Wrangell. |
| St. Elias Packing Co. | Alsek River. |
| Pillar Bay Packing Co. | Point Ellis. |
| Metlakahtla Industrial Co. | Metlakahtla. |
| Pacific Coast & Norway Packing Co. | Petersburg. |
| Yes Bay Canning Co. | Yes Bay. |
| Chilkoot Fisheries Co. | Chilkoot Inlet. |
| Central Alaska: | |
| Northwestern Fisheries Co. | Chignik, Uyak, Kenai, and Orca. |
| Alaska Packers Association. | Kasilof, Karluk (2), Alitak, and Chignik. |
| Columbia River Packers' Association | Chignik. |
| Western Alaska: | |
| Alaska Packers Association. | Nushagak Bay (2), Kvichak Bay (2), Naknek River (2), and Ugaguk River. |
| North Alaska Salmon Co. | Kvichak Bay, Nushagak Bay, Ugaguk River, and Lockanok. |
| Northwestern Fisheries Co. | Nushagak Bay. |
| Naknek Packing Co. | Naknek River. |
| Red Salmon Canning Co. | Ugashik River. |
| Alaska-Portland Packers Association. | Nushagak Bay. |
| Bristol Bay Packing Co. | Kvichak Bay. |
| Alaska Fishermen's Packing Co. | Nushagak Bay. |
| Columbia River Packers Association. | Do. |
| Alaska Salmon Co. | Wood River. |

*Persons engaged.*—The fishermen engaged this year numbered 3,722, of whom slightly more than one-half were white. The cannery employees numbered 8,194, of whom all nationalities show increases as compared with 1909. The transporters numbered 515, an increase over 1909. All branches of the industry show increases as compared with 1909. In all, 12,431 persons were employed, an increase of 1,909 over 1909.

PERSONS ENGAGED IN THE SALMON-CANNING INDUSTRY IN 1910.

| Occupation and race. | Southeast Alaska. | Central Alaska. | Western Alaska. | Total. |
|---|---|---|---|---|
| Fishermen: | | | | |
| Whites | 444 | 485 | 1,541 | 2,470 |
| Indians | 1,153 | 80 | | 1,233 |
| Japanese | 10 | | 9 | 19 |
| Total | 1,607 | 565 | 1,550 | 3,722 |
| Shoresmen: | | | | |
| Whites | 529 | 359 | 1,203 | 2,091 |
| Indians | 1,060 | 121 | 326 | 1,507 |
| Chinese | 705 | 467 | 1,216 | 2,388 |
| Japanese | 472 | 393 | 1,323 | 2,188 |
| Koreans | | 4 | | 4 |
| Filipinos | | | 16 | 16 |
| Total | 2,766 | 1,344 | 4,084 | 8,194 |
| Transporters: | | | | |
| Whites | 184 | 111 | 189 | 484 |
| Indians | 23 | 2 | | 25 |
| Chinese | | 1 | | 1 |
| Japanese | 2 | 3 | | 5 |
| Total | 209 | 117 | 189 | 515 |
| Grand total: | | | | |
| Whites | 1,157 | 955 | 2,933 | 5,045 |
| Indians | 2,236 | 203 | 326 | 2,765 |
| Chinese | 705 | 468 | 1,216 | 2,389 |
| Japanese | 484 | 396 | 1,332 | 2,212 |
| Koreans | | 4 | | 4 |
| Filipinos | | | 16 | 16 |
| Total | 4,582 | 2,026 | 5,823 | 12,431 |

*Investments, wages, etc.*—There were 52 canneries in operation—23 in southeast Alaska, an increase of 4 over 1909; 10 in central Alaska, an increase of 2 over 1909; and 19 in western Alaska, an increase of 1 over 1909; a total increase for all Alaska of 7.

There were 176 steamers and launches over 5 tons, 55 under 5 tons, and 59 sailing vessels engaged in transporting supplies and the pack, and doing general work for the canneries. This is a large increase over 1909.

All forms of apparatus except floating traps show increases over 1909. The increases are especially noticeable in purse seines and stake traps, which increased in number 43 and 27 respectively.

Included in this table for the first time are the items of cash capital, materials used, and wages paid. Considerable misapprehension

seems to have arisen among readers of this report as to the profits of the cannerymen, which have appeared to them enormous. Such an erroneous conclusion is apparently based on the assumption that the price received for the canned product represents practically net profits. For eight years prior to the 1910 season but few of the cannerymen received an adequate return upon the capital invested, while many of them sustained heavy losses during certain years. It has been found difficult to secure accurate data showing the cost of operation, and several items, such as insurance, taxes outside of Alaska, commissions paid the brokers, etc., have not been taken into account, but it is hoped in time to include these.

INVESTMENT IN THE SALMON-CANNING INDUSTRY IN 1910.

| Items. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | *Number.* | *Value.* | *Number.* | *Value.* | *Number.* | *Value.* | *Number.* | *Value.* |
| Canneries | 23 | | 10 | | 19 | | 52 | |
| Transporting vessels: | | | | | | | | |
| Steamers and launches over 5 tons | 110 | $310,450 | 24 | $212,050 | 42 | $605,950 | 176 | $1,128,450 |
| Tonnage | 1,186 | | 1,077 | | 2,507 | | 4,770 | |
| Outfit | | 175,000 | | 72,000 | | 104,000 | | 351,000 |
| Sailing | 16 | 160,250 | 11 | 348,000 | 32 | 711,000 | 59 | 1,219,250 |
| Tonnage | 6,332 | | 17,160 | | 41,748 | | 65,240 | |
| Outfit | | 30,000 | | 20,000 | | 48,000 | | 98,000 |
| Steamers and launches under 5 tons | 39 | 86,300 | 10 | 24,025 | 6 | 13,700 | 55 | 124,025 |
| Boats, sail and row | 541 | 36,163 | 263 | 23,990 | 822 | 178,149 | 1,626 | 238,293 |
| Lighters and scows | 108 | 46,983 | 108 | 57,800 | 130 | 107,529 | 346 | 212,312 |
| Pile drivers | 22 | 45,197 | 21 | 46,300 | 17 | 38,300 | 60 | 129,797 |
| Apparatus: | | | | | | | | |
| Haul seines | 45 | 9,372 | 24 | 18,100 | | | 69 | 27,472 |
| Purse seines | 133 | 38,784 | | | | | 133 | 38,784 |
| Gill nets | 271 | 31,134 | 127 | 16,545 | 880 | 88,957 | 1,278 | 136,636 |
| Traps, stake | 41 | 109,550 | 38 | 51,162 | 14 | 19,500 | 93 | 180,212 |
| Traps, floating | 13 | 22,728 | 1 | 1,500 | | | 14 | 24,228 |
| Spears | 75 | 75 | | | | | 75 | 75 |
| Cash on hand | | 230,000 | | 100,000 | | 190,000 | | 520,000 |
| Shore and accessory property | | 2,016,144 | | 1,291,405 | | 2,913,008 | | 6,220,557 |
| Materials used | | 1,964,493 | | 778,531 | | 1,646,775 | | 4,389,799 |
| Wages paid | | 1,100,678 | | 638,886 | | 1,562,295 | | 3,301,859 |
| Total | | 6,413,301 | | 3,700,294 | | 8,227,154 | | 18,340,749 |

*Output.*—The table of products shows the quantity and value of each species packed, with size and style of cans. As usual, western Alaska leads in value of the pack, but southeast Alaska leads in quantity packed. Red, or sockeye, salmon predominate in central and western Alaska, while humpback, or pink, salmon predominate in southeast Alaska.

OUTPUT OF SALMON FROM THE CANNERIES IN 1910, BY SPECIES AND SIZE OF CANS.[a]

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | *Cases.* | *Value.* | *Cases.* | *Value.* | *Cases.* | *Value.* | *Cases.* | *Value.* |
| Coho, or silver: | | | | | | | | |
| ½-pound flat | 326 | $1,299 | ..... | ..... | ..... | ..... | 326 | $1,299 |
| 1-pound flat | 2,249 | 12,357 | ..... | ..... | ..... | ..... | 2,249 | 12,357 |
| 1-pound tall | 80,045 | 391,251 | 19,928 | $99,103 | 11,641 | $55,656 | 111,614 | 546,010 |
| Total | 82,620 | 404,907 | 19,928 | 99,103 | 11,641 | 55,656 | 114,189 | 559,666 |
| Dog, or chum: | | | | | | | | |
| 1-pound tall | 231,735 | 703,555 | 131 | 403 | 22,352 | 69,451 | 254,218 | 773,409 |
| Humpback, or pink: | | | | | | | | |
| ½-pound flat | 6,375 | 15,871 | ..... | ..... | ..... | ..... | 6,375 | 15,871 |
| 1-pound flat | 7,900 | 35,550 | ..... | ..... | ..... | ..... | 7,900 | 35,550 |
| 1-pound tall | 480,088 | 1,513,937 | 31,797 | 101,380 | 31,348 | 97,317 | 543,233 | 1,712,634 |
| Total | 494,363 | 1,565,358 | 31,797 | 101,380 | 31,348 | 97,317 | 557,508 | 1,764,055 |
| King, or spring: | | | | | | | | |
| ½-pound flat | 108 | 432 | ..... | ..... | ..... | ..... | 108 | 432 |
| 1-pound tall | 294 | 1,566 | 15,786 | 85,235 | 24,087 | 127,569 | 40,167 | 214,370 |
| Total | 402 | 1,998 | 15,786 | 85,235 | 24,087 | 127,569 | 40,275 | 214,802 |
| Red, or sockeye: | | | | | | | | |
| ½-pound flat | 43,166 | 170,489 | ..... | ..... | 1,474 | 5,896 | 44,640 | 176,385 |
| 1-pound flat | 39,941 | 236,453 | ..... | ..... | ..... | ..... | 39,941 | 236,453 |
| 1-pound tall | 199,158 | 1,059,976 | 364,875 | 1,959,539 | 823,973 | 4,342,037 | 1,388,006 | 7,361,552 |
| Total | 282,265 | 1,466,918 | 364,875 | 1,959,539 | 825,447 | 4,347,933 | 1,472,587 | 7,774,390 |
| Grand total | 1,091,385 | 4,142,736 | 432,517 | 2,245,660 | 914,875 | 4,697,926 | 2,438,777 | 11,086,322 |

[a] All pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of cases containing 48 1-pound cans, the pack is 2,413,052½ cases.

*Comparison of pack of 1907, 1908, 1909, and 1910.*—With the exception of 1908, the pack of 1910 exceeds in quantity that of any of the four years, and it exceeds in value any of them, being the most valuable pack ever put up in Alaska.

COMPARISON OF THE OUTPUT OF THE SALMON CANNERIES IN 1907, 1908, 1909, AND 1910.[a]

| Products. | 1907 | | 1908 | | 1909 | | 1910 | |
|---|---|---|---|---|---|---|---|---|
| | *Cases.* | *Value.* | *Cases.* | *Value.* | *Cases.* | *Value.* | *Cases.* | *Value.* |
| Coho, or silver: | | | | | | | | |
| ½-pound flat | 969 | $4,273 | 209 | $627 | ..... | ..... | 326 | $1,299 |
| 1-pound flat | 3,933 | 17,292 | 2,414 | 9,903 | 1,206 | $5,543 | 2,249 | 12,357 |
| 1-pound tall | 80,772 | 315,819 | 66,309 | 263,559 | 55,350 | 225,486 | 111,614 | 546,010 |
| Total | 85,674 | 337,384 | 68,932 | 274,089 | 56,556 | 231,029 | 114,189 | 559,666 |
| Dog, or chum: | | | | | | | | |
| ½-pound flat | 491 | 1,228 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1-pound flat | 664 | 2,125 | 107 | 321 | ..... | ..... | ..... | ..... |
| 1-pound tall | 183,262 | 544,404 | 218,406 | 553,876 | 120,712 | 274,110 | 254,218 | 773,409 |
| Total | 184,417 | 547,757 | 218,513 | 554,197 | 120,712 | 274,110 | 254,218 | 773,409 |
| Humpback, or pink: | | | | | | | | |
| ½-pound flat | 17,589 | 46,093 | ..... | ..... | ..... | ..... | 6,375 | 15,871 |
| 1-pound flat | 7,406 | 26,662 | 569 | 1,590 | ..... | ..... | 7,900 | 35,550 |
| 1-pound tall | 545,772 | 1,726,525 | 643,564 | 1,731,789 | 464,873 | 1,114,839 | 543,233 | 1,712,634 |
| Total | 570,767 | 1,799,280 | 644,133 | 1,733,379 | 464,873 | 1,114,839 | 557,508 | 1,764,055 |
| King, or spring: | | | | | | | | |
| ½-pound flat | 28 | 98 | 125 | 425 | ..... | ..... | 108 | 432 |
| 1-pound tall | 43,410 | 181,620 | 23,667 | 99,442 | 48,034 | 207,624 | 40,167 | 214,370 |
| Total | 43,438 | 181,718 | 23,792 | 99,867 | 48,034 | 207,624 | 40,275 | 214,802 |
| Red, or sockeye: | | | | | | | | |
| ½-pound flat | 45,383 | 160,731 | 21,817 | 68,083 | 16,385 | 63,888 | 44,640 | 176,385 |
| 1-pound flat | 29,821 | 154,646 | 26,950 | 138,120 | 85,193 | 236,609 | 39,941 | 236,453 |
| 1-pound tall | 1,242,600 | 5,599,850 | 1,613,911 | 7,318,048 | 1,611,916 | 7,310,053 | 1,388,006 | 7,361,552 |
| Total | 1,317,804 | 5,915,227 | 1,662,678 | 7,524,251 | 1,713,494 | 7,610,550 | 1,472,587 | 7,774,390 |
| Grand total | 2,202,109 | 8,781,366 | 2,618,048 | 10,185,783 | 2,403,669 | 9,438,152 | 2,438,777 | 11,086,322 |

[a] All pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans.

The following table shows, by species, the average price received by the packer per case of 1-pound talls for a series of years. The 1-pound tall cases are used because they form the vast majority of the pack and are the ones in common use by the consumer, the flat cans being packed for a special trade.

AVERAGE ANNUAL PRICE PER CASE OF 48 1-POUND TALL CANS OF SALMON, 1905–1910.

| Products. | 1905 | 1906 | 1907 | 1908 | 1909 | 1910 |
|---|---|---|---|---|---|---|
| Coho, or silver | $3.20 | $3.63 | $3.91 | $3.98 | $4.07 | $4.89 |
| Dog, or chum | 2.69 | 2.87 | 2.97 | 2.53 | 2.28 | 3.04 |
| Humpback, or pink | 2.95 | 3.00 | 3.16 | 2.69 | 2.40 | 3.15 |
| King, or spring | 3.28 | 3.78 | 4.18 | 4.20 | 4.32 | 5.34 |
| Red, or sockeye | 3.38 | 3.77 | 4.59 | 4.52 | 4.53 | 5.30 |

## PICKLING.

Owing to the low prices which have prevailed during several seasons for whole pickled salmon, there was but little incentive for the salteries to engage in this business very heavily this year. Some shut down altogether, while others very materially curtailed operations. Prices improved during the latter part of the season, but it was then too late.

The action of the Department in forbidding the packing of salmon bellies without making some economic use of the backs contributed to the depression in the pickled trade, as bellies were the most remunerative product prepared. Nearly all of the salters are now agreed, however, that this action was wise and necessary. Under the old wasteful method from one-half to two-thirds of the edible portion of the fish was thrown away and the belly only was pickled.

*Persons engaged.*—This year 261 persons (196 fishermen, 51 shoresmen, and 14 transporters) were employed, a decrease of 135 as compared with 1909.

PERSONS ENGAGED IN THE SALMON-PICKLING INDUSTRY IN 1910.

| How engaged. | Southeast Alaska. | Central Alaska. | Western Alaska. | Total. |
|---|---|---|---|---|
| Fishermen: | | | | |
| Whites | 29 | 3 | 46 | 78 |
| Indians | 13 | 105 | | 118 |
| Total | 42 | 108 | 46 | 196 |
| Shoresmen: | | | | |
| Whites | 5 | 7 | 20 | 32 |
| Indians | 16 | 3 | | 19 |
| Total | 21 | 10 | 20 | 51 |
| Transporters: | | | | |
| Whites | 2 | 2 | 4 | 8 |
| Indians | | 6 | | 6 |
| Total | 2 | 8 | 4 | 14 |
| Grand total | 65 | 126 | 70 | 261 |

*Investment.*—There were 12 salteries (6 in southeast Alaska, 4 in central Alaska, and 2 in western Alaska) in operation, a decrease of 4 as compared with 1909. In addition, a few of the canneries and mild-curing plants also pickled their surplus catch, and while the product has been included in the present table, the men and investment could not be separated from the statistics of the other branches of the industry.

INVESTMENT IN THE SALMON-PICKLING INDUSTRY IN 1910.

| Items. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* |
| Salteries | 6 | | 4 | | 2 | | 12 | |
| Transporting vessels: | | | | | | | | |
| Steamers and launches | 1 | $2,500 | 1 | $12,000 | 1 | $5,000 | 3 | $19,500 |
| Tonnage | 7 | | 40 | | 9 | | 56 | |
| Outfit | | 500 | | 2,400 | | 1,600 | | 4,500 |
| Sailing | 1 | 900 | | | | | 1 | 900 |
| Tonnage | 16 | | | | | | 16 | |
| Outfit | | 200 | | | | | | 200 |
| Launches under 5 tons | 5 | 6,550 | 1 | 1,000 | 1 | 4,500 | 7 | 12,050 |
| Boats, row and sail | 16 | 870 | 39 | 1,160 | 23 | 8,700 | 78 | 10,730 |
| Lighters and scows | 5 | 400 | 2 | 200 | | | 7 | 600 |
| Apparatus: | | | | | | | | |
| Haul seines | 2 | 350 | 22 | 2,230 | | | 24 | 2,580 |
| Purse seines | 10 | 2,800 | | | | | 10 | 2,800 |
| Gill nets | 6 | 800 | | | 23 | 1,725 | 29 | 2,525 |
| Cash capital | | 8,200 | | 11,250 | | 35,000 | | 54,450 |
| Shore and accessory property | | 15,300 | | 9,500 | | 27,000 | | 51,800 |
| Wages paid | | 5,925 | | 16,577 | | 22,590 | | 45,092 |
| Total | | 45,295 | | 56,317 | | 106,115 | | 207,727 |

*Output.*—The output in 1910 amounted to 14,405 barrels, valued at $130,641, as compared with 26,915 barrels and 6,997 half barrels, valued at $208,758, in 1909. A small part of this output is composed of salmon bellies. A few of the backs were pickled and appear in this table, while the rest were either dried, dry-salted, or smoked, and appear under their proper headings in this report.

BARRELS OF SALMON PICKLED IN 1910, BY SPECIES.

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* |
| Coho, or silver | 35 | $296 | 125 | $1,208 | | | 160 | $1,504 |
| Coho bellies | | | 126 | 1,135 | | | 126 | 1,135 |
| Dog, or chum, bellies | 70 | 770 | | | | | 70 | 770 |
| Humpback, or pink | 314 | 1,905 | 13 | 78 | 3 | $15 | 330 | 1,998 |
| Humpback bellies | 421 | 4,410 | 195 | 1,725 | | | 616 | 6,135 |
| King, or spring | | | | | 352 | 3,399 | 352 | 3,399 |
| King fins | 2 | 24 | | | | | 2 | 24 |
| King bellies | 6 | 128 | | | | | 6 | 128 |
| Red, or sockeye | 2 | 20 | 1,485 | 12,278 | 10,444 | 92,351 | 11,931 | 104,649 |
| Red tips | | | | | 4 | 60 | 4 | 60 |
| Red bellies | 3 | 24 | 805 | 10,815 | | | 808 | 10,839 |
| Total | 853 | 7,577 | 2,749 | 27,239 | 10,803 | 95,825 | 14,405 | 130,641 |

## MILD CURING.

At the opening of the present season the mild-curing industry was in better condition than for several years previous, as the pack of 1909 had been disposed of and prices for the new pack were ruling fairly high. Owing to this the packers extended their operations as much as possible, and as a result the pack this year is the largest ever put up in Alaska.

With the exception of a small quantity put up in Cook Inlet, central Alaska, the packing of mild-cured salmon was confined to southeast Alaska, although it is more than probable that the packers will soon extend their operations into western Alaska and parts of central Alaska not now worked.

As in previous years the principal trouble the packers experience is in getting rid of the white-meated king salmon with the least possible loss. These fish average about one-fourth of the total catch, and the fishermen insist that the dealers shall take them along with the others, which they do at a considerably lower price. A few of the larger of these white-meated kings are mild-cured. Early in the season many of them, together with the small red-meated fish, are shipped fresh to the Puget Sound ports, but after the kings begin to run in the Sound this is unprofitable.

*Persons engaged.*—This year 656 persons (560 fishermen, 68 shoresmen, and 28 transporters) were engaged in the mild-curing industry, as compared with 521 in 1909, a gain of 135. A number of others also were engaged for limited periods, but as their work in connection with other branches of the salmon business was more important they have been included there.

PERSONS ENGAGED IN THE SALMON MILD-CURING INDUSTRY IN 1910.

| Occupation and race. | Southeast Alaska. | Central Alaska. | Total. |
|---|---|---|---|
| Fishermen: | | | |
| Whites | 354 | 10 | 364 |
| Indians | 196 | | 196 |
| Total | 550 | 10 | 560 |
| Shoresmen: | | | |
| Whites | 65 | | 65 |
| Indians | 3 | | 3 |
| Total | 68 | | 68 |
| Transporters: | | | |
| Whites | 15 | | 15 |
| Indians | 13 | | 13 |
| Total | 28 | | 28 |
| Grand total | 646 | 10 | 656 |

*Investment.*—There were 14 fixed plants (13 in southeast Alaska and 1 in central Alaska)—i. e., plants with permanent buildings and a chief business of mild-curing salmon—operated in Alaska this year. A considerable part of this industry is done by schooners and launches, the crews of which catch the fish in small boats and pack them aboard the vessels, moving from place to place with the schools of salmon.

INVESTMENT IN THE SALMON MILD-CURING INDUSTRY IN 1910.

| Items. | Southeast Alaska. | | Central Alaska. | | Total. | |
|---|---|---|---|---|---|---|
| | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* |
| Fixed plants | 13 | | 1 | | 14 | |
| Transporting vessels: | | | | | | |
| Steamers and launches (over 5 tons) | 23 | $51,500 | | | 23 | $51,500 |
| Tonnage | 179 | | | | 179 | |
| Outfit | | 35,000 | | | | 35,000 |
| Sailing vessels | 2 | 4,000 | | | 2 | 4,000 |
| Tonnage | 67 | | | | 67 | |
| Outfit | | 3,000 | | | | 3,000 |
| Steamers and launches (under 5 tons) | 35 | [a] 42,750 | | | 35 | 42,750 |
| Boats, sail and row | 402 | 14,365 | 5 | $1,000 | 407 | 15,365 |
| Scows | 20 | 10,100 | | | 20 | 10,100 |
| Apparatus, shore fisheries: | | | | | | |
| Gill nets | 138 | 26,225 | 5 | 750 | 143 | 26,975 |
| Lines, trolling | | 471 | | | | 471 |
| Shore and accessory property | | 40,920 | | | | 40,920 |
| Cash capital | | 86,000 | | | | 86,000 |
| Wages paid | | 46,537 | | 1,200 | | 47,737 |
| Total | | 360,868 | | 2,950 | | 363,818 |

[a] Includes outfit.

*Catch, by apparatus and products.*—All told, 164,520 red-meated and 22,525 white-meated king salmon were required in preparing the pack. The greater part of these fish were caught with trolling lines. The pack of 3,357 tierces, which sold for $220,673, is an increase of 1,065 tierces and $71,373 over 1909.

CATCH OF SALMON FOR MILD-CURING, 1910, BY APPARATUS AND SPECIES.

| Apparatus and species. | Southeast Alaska. | Central Alaska. | Total. |
|---|---|---|---|
| Gill nets: | *Number.* | *Number.* | *Number.* |
| Red king salmon | 20,864 | 1,767 | 22,631 |
| White king salmon | 2,656 | | 2,656 |
| Total | 23,520 | 1,767 | 25,287 |
| Lines: | | | |
| Red king salmon | 141,889 | | 141,889 |
| White king salmon | 19,869 | | 19,869 |
| Total | 161,758 | | 161,758 |
| Grand total | 185,278 | 1,767 | 187,045 |

PRODUCTS OF THE SALMON MILD-CURING INDUSTRY IN 1910.

| Products. | Tierces. | Round weight of fish. | Dressed weight of fish. | Value. |
|---|---|---|---|---|
| | | *Pounds.* | *Pounds.* | |
| Southeast Alaska: | | | | |
| Red king salmon | 3,022 | 3,475,300 | 2,468,198 | $209,826 |
| White king salmon | 304 | 349,600 | 246,700 | 8,615 |
| Total | 3,326 | 3,824,900 | 2,714,898 | 218,441 |
| Central Alaska: | | | | |
| Red king salmon | 31 | 35,650 | 24,800 | 2,232 |
| Total: | | | | |
| Red king salmon | 3,053 | 3,510,950 | 2,492,998 | 212,058 |
| White king salmon | 304 | 349,600 | 246,700 | 8,615 |
| Grand total | 3,357 | 3,860,550 | 2,739,698 | 220,673 |

## FRESH SALMON.

As in previous years large quantities of king salmon (mainly white-meated and small red-meated fish) were shipped fresh to Puget Sound ports, where they brought very good prices up to the time king salmon began to run in the Sound waters.

Shortly after the canning season opened certain fishermen with headquarters at Petersburg and Wrangell became dissatisfied with the prices offered by neighboring canneries, and failing to come to an agreement began shipping their catches of red and coho salmon fresh to Puget Sound ports, where they received fair prices.

## MINOR PRESERVING PROCESSES.

*Dry salting and drying.*—At a few places in central Alaska the bellies of red and coho salmon are cut out and pickled, after which the backs are dried in the sun, and the resulting product, called "ukalu," used for fox food at the fox ranches and for dog food.

The dry salting of dog salmon for food has almost ceased, but 22,178 pounds, valued at $554, being prepared this year.

*Smoking.*—A delicious smoked product, known locally as "beleke," is put up at Kodiak and several other places, the backs of red, coho, and humpback salmon being used. A considerable quantity of white-meated king salmon, cut into steaks, was smoked in southeast Alaska this year.

*Freezing.*—The only establishments engaged in freezing salmon are at Taku Harbor and Ketchikan, in southeast Alaska. Only a small business is done in the freezing of salmon, halibut being the principal product of these plants. Black bass, black cod, and steelhead trout are among the miscellaneous products prepared.

## RETURN OF MARKED SALMON.

A number of salmon bearing mutilations of certain fins, apparent brands, or with missing fins, were observed during the summer, as occurs every season. So far as these concern single fins they are not to be referred to any known artificial marks placed upon fish as a means of identification. Twelve of them, however, were red salmon lacking both ventral fins and are identified as returns from a definite marking experiment which has yielded annual results since 1906. This continued return of marked red salmon to southeast Alaska is of particular interest. These fish were marked by Mr. F. M. Chamberlain as fingerlings about three months old, in August, 1903, at Fortmann hatchery, and liberated in Naha Stream above Heckman Lake. The mark consisted of the complete excision of both ventral fins. The number of marked fish liberated was 1,600. The returns which are considered to have been satisfactorily identified are shown, by the year and locality, in the following table:

MARKED SALMON IDENTIFIED UPON RETURN TO STREAMS, 1906–1910.

| Years. | Naha. | Yes Bay. | Karluk. | Total. | Age of fish. |
|---|---|---|---|---|---|
| | | | | | *Years.* |
| 1906 | 2 | | | 2 | 3½ |
| 1907 | 13 | | | 13 | 4½ |
| 1908 | 5 | 3 | | 8 | 5½ |
| 1909 | | 4 | 1 | 5 | 6½ |
| 1910 | 1 | 10 | 1 | 12 | 7½ |
| Total | 21 | 17 | 2 | 40 | |

One of the 10 fish credited to Yes Bay in 1910 was caught in the bay by commercial fishermen and preserved by freezing at Ketchikan, where it was examined by the assistant agent on July 23. It was a male 20.5 inches in length and weighed 3¾ pounds. All the other marked fish assigned to Yes Bay for any year were taken at the Government hatchery at the head of Yes Lake.

These 40 fish are 2½ per cent of the 1,600 marked. The observed return is certainly somewhat larger and possibly greatly surpasses these figures. An indeterminate number, estimated at between 50 and 100, were reported to have been seen at Yes Lake hatchery in 1906, but of these no specimens were saved. No account has been taken of these in the above table, since there is no basis for determining how many of the presumed marks were certainly of the same nature as those accepted as representing actual returns. Salmon lacking a single ventral fin are frequently seen in the runs, and some mutilations of this pair of fins are to be distinguished from the results of artificial marking. While the table shows but one marked fish

taken at Karluk in 1909, several were reported, the exact number being unknown. The one of which account has been taken is based upon examination of a preserved specimen. The few taken at Karluk are the only specimens known to have returned outside of southeast Alaska.

The relation of the return to the parent stream and adjoining streams of southeast Alaska, in which most of the marked fish were retaken, is of importance. Excluding the uncertain return to Yes Bay in 1906, over half the returning fish succeeded in reaching the parent stream, and even with these Yes Bay fish included, a considerable proportion still belongs to the parent stream, while by far the larger part of the known return is confined to the region within 40 miles of the parent stream. It is obviously indicated that red salmon return to the general region in which they were hatched, rather than to remote regions, and that a considerable number reach the particular region of their origin, or their parent stream.

The return from the original plant of marked fish has now covered five successive seasons, indicating a variation of at least five years in the life period of a single hatch of red salmon. The known return had been diminishing in numbers since 1907 up to the current year, when it considerably increased. This is a somewhat anomalous result, and inconsistent with that gradual dwindling in numbers and disappearance from the runs of fish bearing this mark which was expected to occur. While the acceptance of these fish as conclusively indentical with the marked salmon of 1903 depends on the cessation of their occurrence within a reasonable time, there is at present no sufficient reason for doubting that they are the same.

## OBSERVATIONS IN WOOD RIVER REGION.

Mr. H. C. Fassett, inspector of fisheries in Alaska, represented the Bureau in western Alaska, with headquarters on Nushagak Bay, and had charge of the investigations in the Nushagak region. The order closing both Wood and Nushagak Rivers was uniformly observed, and without its restrictive effect a considerable proportion of the reduced quota escaping to the spawning grounds through Wood River would have been taken. Eight fish traps were operated on the bay and two in Igushik River, the latter yielding but few fish. The total take of traps was about 596,000, of which about 29 per cent were red salmon. These traps took 11.2 per cent of the whole catch of the Nushagak region, and 3.9 per cent of the whole red salmon catch.

The following table shows the total Nushagak catch (including 85,000 red salmon from Igushik River) and its content as to the five species of salmon. The red salmon catch is 83.5 per cent of the total number of salmon taken.

CATCH OF DIFFERENT SPECIES OF SALMON IN NUSHAGAK REGION, 1910.

| Species. | Catch. | Species. | Catch. |
|---|---|---|---|
| King | 86,433 | Pink | 440,369 |
| Red | 4,427,626 | Dog | 206,220 |
| Coho | 139,200 | Total | 5,299,848 |

## COUNT OF THE BREEDING RUN IN WOOD RIVER.

The count of salmon escaping from the fishermen and ascending to the spawning grounds by way of Wood River was again made as in the two past years. The actual daily tally made at the rack at the foot of Lake Aleknagik is as follows:

DAILY TALLY OF REDFISH INTO LAKE ALEKNAGIK DURING THE SEASON OF 1910.

| Date. | Number. | Date. | Number. | Date. | Number. |
|---|---|---|---|---|---|
| July 4 | 167 | July 15 | 125,621 | July 26 | 1,162 |
| 5 | 1,042 | 16 | 64,026 | 27 | 927 |
| 6 | 2,717 | 17 | 29,964 | 28 | 715 |
| 7 | 12,036 | 18 | 31,628 | 29 | 873 |
| 8 | 13,131 | 19 | 13,642 | 30 | 708 |
| 9 | 72,073 | 20 | 10,928 | 31 | 385 |
| 10 | 105,835 | 21 | 10,000 | Aug. 1 | 361 |
| 11 | 70,252 | 22 | 4,881 | 2 | 139 |
| 12 | 26,772 | 23 | 3,618 | | |
| 13 | 24,223 | 24 | 2,747 | Total | 670,104 |
| 14 | 37,612 | 25 | 1,919 | | |

The run came into Nushagak Bay about July 3. The rack at the lake was completed and made tight on July 3, but no fish were seen until the 4th. The tally of July 7 probably represents the advance of the main run. As in the preceding year, there were two distinct impulses in the run at the lake, the height of the run or largest tally occurring on the 15th, or one day later than in the two preceding seasons.

RECORD OF METEOROLOGICAL OBSERVATIONS AT THE SALMON RACK AT LAKE ALEKNAGIK, ALASKA, DURING SEASON OF 1910.

| Date. | Hour. | Temperatures. Air. At reading. | Air. Maximum. | Air. Minimum. | Lake at 6 feet depth. | Barometer reading. | Weather conditions. Clouds in sky (amount 1 to 10). | Wind (force and direction). | Rainfall (heavy, moderate, light, trace). | Lake conditions. Depth at rack-gate. | Current at rack (per minute). | Drift (much, little, none). | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *Inches.* | | | | *Ft. in.* | *Feet.* | | |
| June 25 | 12 m. | 53 | 58 | 51 | 40 | 30.16 | 10 | SE. light | | | | Much | |
| | 6 p. m. | 50 | 52 | 50 | 40 | 30.19 | 10 | S. light | | 11 5 | | Much | |
| | 12 p. m. | 42 | 49 | 42 | 40 | 30.17 | 10 | SW. light | Trace | | | Much | |
| 26 | 6 a. m. | 40 | 42 | 37 | 39 | 30.21 | 10 | SW. light | | | | Much | |
| | 12 m. | 43 | 43.5 | 39.5 | 39.5 | 30.20 | 10 | N. light | | 11 3 | | Little | |
| | 6 p. m. | 43.5 | 46.5 | 40.0 | 39.5 | 30.17 | 10 | Calm | Trace | | | Little | Lake like glass. |
| | 12 p. m. | 39.5 | 43.0 | 38.5 | 39.6 | 30.15 | 10 | S. light | Little | | | Little | |
| 27 | 6 a. m. | 42.0 | 42.5 | 39.0 | 40.0 | 30.14 | 10 | NW. moderate | Trace | | | Little | Heavy mist. |
| | 12 m. | 45.2 | 44.6 | 40.8 | 40.0 | 30.13 | 10 | SW. moderate | Light | 11 1 | | Little | |
| | 6 p. m. | 44.6 | 44.8 | 43.5 | 39.6 | 30.15 | 10 | SSE. moderate | Light | | | Little | |
| | 12 p. m. | 41.5 | 44.0 | 41.0 | 39.6 | 30.17 | 10 | S. moderate | Light | | | Little | |
| 28 | 6 a. m. | 40.2 | 41.0 | 38.5 | 39.6 | 30.19 | 10 | SW. moderate | Light | | | Little | |
| | 12 m. | 44.2 | 43.2 | 39.0 | 39.6 | 30.20 | 10 | SW. light | Light | 11 0 | | Little | |
| | 6 p. m. | 45.0 | 52.5 | 43.2 | 39.8 | 30.18 | 10 | W. light | None | | | Little | |
| | 12 p. m. | 42.0 | 42.2 | 41.8 | 39.8 | 30.19 | 10 | SW. light | Mist | | | Little | |
| 29 | 6 a. m. | 41.2 | 42.0 | 37.5 | 40.0 | 30.15 | 10 | WSW. light | Mist | | | Little | Thick fog. |
| | 12 m. | 50.0 | 49.3 | 37.6 | 40.5 | 30.12 | 10 | NNE. moderate | None | 11 0 | | Little | |
| | 6 p. m. | 44.0 | 49.7 | 44.0 | 40.0 | 30.11 | 10 | SE. light | Light | | | Little | |
| | 12 p. m. | 43.5 | 43.8 | 42.0 | 40.0 | 30.10 | 10 | S. light | Light | | | Little | |
| 30 | 6 a. m. | 43.0 | 43.0 | 39.8 | 40.0 | 30.14 | 10 | SW. light | Light | | | Little | |
| | 12 m. | 42.2 | 43.8 | 40.0 | 39.8 | 30.19 | 10 | SE. light | Light | 11 1 | | Little | |
| | 6 p. m. | 45.5 | 45.0 | 43.0 | 40.0 | 30.17 | 10 | ESE. light | None | | | Little | |
| | 12 p. m. | 43.0 | 45.0 | 42.0 | 39.8 | 30.17 | 10 | S. moderate | Light | | | Little | |
| July 1 | 6 a. m. | 42.8 | 45.0 | 39.8 | 40.0 | 30.05 | 10 | E. light | Light | | | Little | |
| | 12 m. | 47.0 | 48.0 | 42.6 | 39.8 | 29.99 | 10 | W. light | Light | 11 3 | | Little | |
| | 6 p. m. | 45.2 | 48.5 | 43.0 | 40.0 | 29.93 | 10 | E. light | Light | | | Little | |
| | 12 p. m. | 43.0 | 45.8 | 42.8 | 40.0 | 29.91 | 10 | NW. light | Light | | | Little | |
| 2 | 6 a. m. | 43.5 | 44.0 | 41.2 | 40.0 | 29.87 | 10 | NW. light | Light | | | Little | |
| | 12 m. | 50.2 | 50.0 | 43.0 | 40.2 | 29.81 | 10 | NW. light | None | 11 5 | | Little | |
| | 6 p. m. | 54.5 | 53.8 | 49.0 | 40.6 | 29.75 | 10 | W. light | Light | | | Much | |
| | 12 p. m. | 49.0 | 51.2 | 49.2 | 40.0 | 29.75 | 10 | NW. light | None | | | Much | |
| 3 | 6 a. m. | 42.6 | 44.8 | 41.2 | 40.0 | 29.73 | 10 | N. light | None | | | Much | |
| | 12 m. | 49.2 | 49.5 | 42.7 | 40.8 | 29.75 | 10 | S. light | Light | 11 6 | | Much | |
| | 6 p. m. | 46.0 | 52.8 | 43.5 | 40.0 | 29.75 | 10 | S. light | None | | | Much | |
| | 12 p. m. | 45.0 | 45.0 | 43.0 | 40.0 | 29.75 | 10 | N. light | Light | 11 6 | | Much | |
| 4 | 6 a. m. | 51.0 | 51.0 | 43.0 | 40.7 | 29.84 | 9 | N., light | None | 11 7 | | Much | |
| | 12 m. | 63.0 | 63.2 | 42.0 | 41.0 | 29.87 | 9 | SE., light | None | 11 7.5 | | Much | |

RECORD OF METEOROLOGICAL OBSERVATIONS AT THE SALMON RACK AT LAKE ALEKNAGIK, ALASKA, DURING SEASON OF 1910—Continued.

| Date. | Hour. | Temperatures. Air. At reading. | Air. Maximum. | Air. Minimum. | Lake at 6 feet depth. | Barometer reading. | Weather conditions. Clouds in sky (amount 1 to 10). | Wind (force and direction). | Rainfall (heavy, moderate, light, trace). | Lake conditions. Depth at rack-gate. | Current at rack (per minute). | Drift (much, little, none). | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | *Inches.* | | | | *Ft. in.* | *Feet.* | | |
| July 4 | 6 p. m. | 59.8 | 65.1 | 56.0 | 41.0 | 29.91 | 10 | NW., light | Light | 11 7.2 | | Much | Showers in p. m. |
| | 12 p. m. | 46.2 | 61.0 | 46.0 | 41.0 | 29.96 | 10 | NE., light | None | 11 7.6 | | Little | |
| 5 | 6 a. m. | 50.2 | 69.8 | 41.0 | 40.8 | 30.03 | 9 | N., light | None | 11 7.7 | | Little | |
| | 12 m. | 61.8 | 63.5 | 41.6 | 41.0 | 30.10 | 8 | SE., moderate | None | 11 7.7 | | Much | |
| | 6 p. m. | 64.2 | 63.5 | 55.5 | 41.5 | 30.11 | 8 | S., light | None | 11 7.5 | | Much | |
| | 12 p. m. | 44.6 | 67.0 | 44.6 | 41.0 | 30.12 | 3 | N., light | None | 11 7.5 | | Much | |
| 6 | 6 a. m. | 50.7 | 51.0 | 37.5 | 41.0 | 30.21 | 2 | W., light | None | 11 7.6 | | Much | |
| | 12 m. | 76.2 | 78.0 | 52.5 | 41.0 | 30.24 | 6 | S., light | None | 11 7.5 | | Much | Hot sunshine. |
| | 6 p. m. | 60.2 | 78.0 | 59.2 | 41.0 | 30.25 | 3 | SE., moderate | None | 11 7.0 | | Much | |
| | 12 p. m. | 50.0 | 60.8 | 50.0 | 41.0 | 30.30 | 8 | SE., light | None | 11 7.0 | | Much | |
| 7 | 6 a. m. | 44.8 | 44.8 | 37.2 | 41.0 | 30.32 | 9 | ESE., moderate | None | 11 7.0 | | Much | More drift than usual. |
| | 12 m. | 57.2 | 57.0 | 42.1 | 41.8 | 30.33 | 7 | SE., light | None | 11 7.0 | 140 | Much | |
| | 6 p. m. | 55.1 | 62.8 | 51.2 | 42.0 | 30.33 | 8 | W., light | None | 11 6.7 | | Much | |
| | 12 p. m. | 43.2 | 68.0 | 43.2 | 42.0 | 30.33 | 9 | ESE., light | None | 11 6.7 | | Much | |
| 8 | 6 a. m. | 42.2 | 43.0 | 40.7 | 41.0 | 30.33 | 7 | E., light | None | 11 6.6 | | Much | |
| | 12 m. | 62.5 | 60.0 | 40.2 | 41.2 | 30.33 | 2 | S., light | None | 11 6.2 | 180 | Little | |
| | 6 p. m. | 69.1 | 67.8 | 59.0 | 42.0 | 30.27 | 3 | W., light | None | 11 5.8 | | Little | |
| | 12 p. m. | 52.2 | 66.2 | 48.5 | 42.0 | 30.24 | 8 | NE., light | None | 11 5.7 | | Much | |
| 9 | 6 a. m. | 52.6 | 53.0 | 42.5 | 42.0 | 30.19 | 7 | NE., fresh | None | 11 5.6 | | Little | |
| | 12 m. | 60.2 | 65.2 | 52.5 | 42.0 | 30.16 | 9 | NE., light | None | 11 5.2 | 180 | Little | |
| | 6 p. m. | 52.2 | 61.0 | 51.0 | 41.0 | 30.15 | 10 | SW., light | None | 11 5.0 | | Little | Gloomy and threatening. |
| | 12 p. m. | 48.8 | 52.8 | 48.8 | 41.0 | 30.18 | 10 | N., light | None | 11 4.2 | | Little | |
| 10 | 6 a. m. | 49.9 | 48.9 | 46.0 | 41.0 | 30.21 | 10 | SW., light | None | 11 4.0 | | Little | |
| | 12 m. | 59.2 | 59.4 | 49.5 | 42.5 | 30.22 | 8 | WSW., light | None | 11 3.8 | 185 | Little | |
| | 6 p. m. | 57.7 | 68.8 | 51.2 | 43.5 | 30.15 | 7 | WSW., light | None | 11 3.5 | | Little | |
| | 12 p. m. | 58.1 | 57.6 | 53.6 | 43.5 | 30.15 | 4 | NW., light | None | 11 3.1 | | Little | |
| 11 | 6 a. m. | 50.2 | 55.2 | 45.0 | 42.0 | 30.11 | 7 | NW., light | None | 11 2.7 | | Little | |
| | 12 m. | 59.7 | 72.2 | 50.0 | 44.8 | 30.11 | 10 | S., light | None | 11 2.4 | 190 | Little | |
| | 6 p. m. | 61.0 | 71.2 | 56.8 | 43.0 | 30.09 | 8 | W., fresh | None | 11 2.0 | | Little | |
| | 12 p. m. | 48.4 | 59.2 | 47.5 | 42.0 | 30.09 | 8 | W., light | None | 11 1.8 | | Little | |
| 12 | 6 a. m. | 46.2 | 49.8 | 40.2 | 41.2 | 30.14 | 9 | WSW., light | None | 11 1.0 | | Much | |
| | 12 m. | 76.1 | 77.2 | 46.4 | 43.2 | 30.15 | 6 | W., light | None | 11 0.8 | 185 | Much | |
| | 6 p. m. | 51.3 | 77.2 | 50.0 | 44.0 | 30.15 | 2 | SW., fresh | None | 11 0.5 | | Much | |
| | 12 p. m. | 44.2 | 50.8 | 43.0 | 42.0 | 30.20 | 2 | N., light | None | 11 0.2 | | Much | |
| 13 | 6 a. m. | 48.0 | 48.8 | 41.4 | 42.0 | 30.21 | 1 | NW., light | None | 10 11.5 | | Little | |
| | 12 m. | 57.8 | 57.2 | 42.7 | 45.0 | 30.22 | 4 | W., heavy | None | 10 11.0 | 180 | Much | Hard blow from west. |
| | 6 p. m. | 53.8 | 58.2 | 49.3 | 45.0 | 30.22 | 3 | N., light | None | 10 10.5 | | Much | |

| | | | | | | |
|---|---|---|---|---|---|---|
| 14 | 12 p. m. | 53.0 | 54.3 | 45.5 | 42.5 | 30.27 |
| | 6 a. m. | 51.6 | 51.1 | 40.4 | 42.0 | 30.33 |
| | 12 m. | 57.9 | 59.0 | 50.2 | 44.5 | 30.34 |
| | 6 p. m. | 62.4 | 69.2 | 55.4 | 45.0 | 30.29 |
| | 12 p. m. | 41.8 | 60.2 | 41.8 | 45.0 | 30.29 |
| 15 | 6 a. m. | 39.4 | 42.4 | 38.4 | 47.0 | 30.24 |
| | 12 m. | 49.8 | 50.6 | 39.0 | 44.6 | 30.11 |
| | 6 p. m. | 50.8 | 53.2 | 49.0 | 44.0 | 29.99 |
| | 12 p. m. | 49.0 | 52.0 | 47.5 | 44.0 | 29.98 |
| 16 | 6 a. m. | 45.8 | 51.0 | 43.6 | 43.0 | 30.00 |
| | 12 m. | 65.0 | 65.0 | 41.5 | 45.0 | 30.07 |
| | 6 p. m. | 58.5 | 66.3 | 50.9 | 43.0 | 30.08 |
| | 12 p. m. | 50.2 | 58.5 | 50.2 | 44.0 | 30.14 |
| 17 | 6 a. m. | 46.3 | 50.8 | 45.1 | 42.5 | 30.18 |
| | 12 m. | 48.0 | ..... | 45.0 | 43.5 | 30.20 |
| | 6 p. m. | 47.9 | ..... | 44.8 | 44.5 | 30.20 |
| | 12 p. m. | 40.5 | ..... | 40.5 | 43.0 | 30.24 |
| 18 | 6 a. m. | 42.0 | ..... | 40.6 | 45.0 | 30.27 |
| | 12 m. | 46.8 | ..... | 40.8 | 43.5 | 30.35 |
| | 6 p. m. | 47.8 | ..... | 40.8 | 44.5 | 30.36 |
| | 12 p. m. | 43.5 | ..... | 43.5 | 44.0 | 30.38 |
| 19 | 6 a. m. | 42.8 | ..... | 42.8 | 43.5 | 30.34 |
| | 12 m. | 48.2 | ..... | 41.7 | 43.0 | 30.27 |
| | 6 p. m. | 47.0 | 51.3 | 46.5 | 43.0 | 30.27 |
| | 12 p. m. | 45.5 | 51.4 | 44.8 | 43.0 | 30.25 |
| 20 | 6 a. m. | 45.5 | 52.8 | 44.7 | 42.5 | 30.14 |
| | 12 m. | 49.5 | 53.0 | 44.7 | 42.5 | 30.09 |
| | 6 p. m. | 49.5 | 53.0 | 44.8 | 43.0 | 30.07 |
| | 12 p. m. | 48.3 | 53.7 | 47.2 | 43.0 | 30.08 |
| 21 | 6 a. m. | 46.5 | 51.7 | 44.3 | 43.5 | 30.06 |
| | 12 m. | 46.0 | 50.0 | 42.2 | 44.0 | 30.03 |
| | 6 p. m. | 51.2 | 66.7 | 42.0 | 45.5 | 30.01 |
| | 12 p. m. | 48.0 | 66.8 | 45.7 | 44.5 | 30.04 |
| 22 | 6 a. m. | 45.3 | 51.7 | 43.6 | 43.0 | 30.06 |
| | 12 m. | 79.0 | 85.0 | 45.5 | 44.0 | 30.10 |
| | 6 p. m. | 62.8 | 84.8 | 43.5 | 46.5 | 30.12 |
| | 12 p. m. | 52.8 | 67.5 | 46.0 | 44.0 | 30.14 |
| 23 | 6 a. m. | 46.7 | 54.0 | 39.8 | 42.5 | 30.12 |
| | 12 m. | 59.0 | 68.6 | 47.3 | 46.0 | 30.14 |
| | 6 p. m. | 68.0 | 80.3 | 56.5 | 47.0 | 30.18 |
| | 12 p. m. | 41.2 | 69.7 | 41.2 | 44.0 | 30.35 |
| 24 | 6 a. m. | 41.1 | 44.2 | 38.0 | 44.5 | 30.41 |
| | 12 m. | 56.7 | 60.5 | 40.5 | 46.0 | 30.43 |
| | 6 p. m. | 58.2 | 66.6 | 56.7 | 48.0 | 30.45 |
| | 12 p. m. | 41.5 | 60.8 | 41.5 | 46.5 | 30.52 |
| 25 | 6 a. m. | 41.0 | 44.7 | 39.8 | 45.5 | 30.55 |
| | 12 m. | 51.7 | 58.3 | 40.5 | 46.5 | 30.60 |
| | 6 p. m. | 54.8 | 61.7 | 51.4 | 47.5 | 30.57 |
| | 12 p. m. | 41.7 | 58.4 | 41.7 | 46.0 | 30.63 |
| 26 | 6 a. m. | 40.4 | 45.8 | 40.1 | 45.5 | 30.63 |
| | 12 m. | 49.0 | 53.7 | 40.1 | 44.0 | 30.63 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | N., light | None | 10 | 10.3 | ..... | Much | |
| 8 | NW., light | None | 10 | 9.4 | ..... | Much | |
| 4 | W., light | None | 10 | 9.0 | 180 | Much | |
| 4 | S., light | None | 10 | 8.5 | ..... | Much | |
| 10 | S., light | Fog | 10 | 8.0 | ..... | Much | Foggy. |
| 10 | SW., light | Fog | 10 | 7.5 | ..... | Little | Do. |
| 10 | NW., light | None | 10 | 7.5 | 170 | Little | |
| 10 | Calm | Light | 10 | 7.0 | ..... | Little | Showery. |
| 10 | Calm | Light | 10 | 6.5 | ..... | Little | Do. |
| 10 | Calm | None | 10 | 6.0 | ..... | Little | |
| 9 | NW., light | None | 10 | 5.5 | 166 | Little | |
| 9 | Calm | None | 10 | 5.0 | ..... | Little | Warm. |
| 10 | Calm | None | 10 | 4.5 | ..... | Little | |
| 10 | Calm | Fog | 10 | 4.0 | ..... | None | Foggy. |
| 10 | S., light | Mist | 10 | 3.5 | 170 | None | Disagreeable. |
| 10 | SSE., moderate | None | 10 | 3.0 | ..... | Little | Boisterous. |
| 10 | SSE., light | Mist | 10 | 2.5 | ..... | None | Misty. |
| 10 | SSE., light | None | 10 | 2.0 | ..... | Little | Gloomy. |
| 8 | SSE., light | None | 10 | 1.3 | 170 | Little | |
| 10 | SSE., light | None | 10 | 0.7 | ..... | Little | Sun at times. |
| 10 | SSE., light | Light | 10 | 0.3 | ..... | None | Threatening. |
| 10 | SSE., moderate | Moderate | 10 | 0.0 | ..... | None | Stormy. |
| 10 | SSE., moderate | Moderate | 9 | 11.5 | 180 | Little | Do. |
| 10 | SSE., light | Light | 9 | 11.0 | ..... | Little | Gloomy. |
| 10 | SSE., light | Light | 9 | 10.5 | ..... | None | Do. |
| 10 | Calm | Mist | 9 | 10.3 | ..... | Little | Thick; misty. |
| 10 | SE., light | Mist | 9 | 10.0 | 160 | Increasing. | Do. |
| 8 | S., light | None | 9 | 9.5 | ..... | Moderate | Clearing. |
| 10 | SSW., moderate | Moderate | 9 | 9.3 | ..... | Moderate | Unsettled. |
| 10 | SW., moderate | Heavy | 9 | 9.0 | ..... | Little | Boisterous. |
| 6 | SW., moderate | None | 9 | 8.7 | 170 | Little | Clearing. |
| 3 | SW., light | None | 9 | 8.2 | ..... | Moderate | Sunny. |
| 9 | Calm | None | 9 | 8.0 | ..... | Little | |
| 7 | Calm | None | 9 | 7.5 | ..... | Little | Pleasant. |
| 4 | Calm | None | 9 | 7.0 | 154 | Moderate | Do. |
| 1 | Calm | None | 9 | 6.5 | ..... | Little | Do. |
| 0 | WSW., light | None | 9 | 6.0 | ..... | None | Bright moonlight. |
| 9 | Calm | None | 9 | 5.7 | ..... | None | |
| 1 | W., light | None | 9 | 5.2 | 150 | Little | Pleasant. |
| 8 | W., light | None | 9 | 4.7 | ..... | Little | Do. |
| 1 | Calm | None | 9 | 4.3 | ..... | None | Do. |
| 10 | Calm | Fog | 9 | 4.0 | ..... | None | Thick; foggy. |
| 1 | ESE., light | None | 9 | 3.5 | 160 | Little | Pleasant. |
| 1 | ESE., light | None | 9 | 3.0 | ..... | Little | Do. |
| 1 | SE., light | None | 9 | 2.5 | ..... | Little | Unsettled. |
| 10 | SE., light | Fog | 9 | 2.0 | ..... | Little | Raw and foggy. |
| 2 | ENE., light | None | 9 | 1.5 | 150 | None | Pleasant. |
| 1 | ENE., light | None | 9 | 1.0 | ..... | None | Do. |
| 10 | ENE., light | None | 9 | 0.5 | ..... | None | Do. |
| 10 | E., light | Fog | 9 | 0.2 | ..... | None | Foggy. |
| 10 | E., light | Mist | 9 | 0.0 | 146 | None | Misty. |

RECORD OF METEOROLOGICAL OBSERVATIONS AT THE SALMON RACK AT LAKE ALEKNAGIK, ALASKA, DURING SEASON OF 1910—Continued.

| Date. | Hour. | Temperatures. | | | | Barometer reading. | Weather conditions. | | | Lake conditions. | | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Air. | | | Lake at 6 feet depth. | | Clouds in sky (amount 1 to 10). | Wind (force and direction). | Rainfall (heavy, moderate, light, trace). | Depth at rack-gate. | Current at rack (per minute). | Drift (much, little, none). | |
| | | At reading. | Maximum. | Minimum. | | | | | | | | | |
| | | | | | | *Inches.* | | | | *Ft. in.* | *Feet.* | | |
| July 26 | 6 p. m. | 54.1 | 60.2 | 48.3 | 44.5 | 30.55 | 0 | ESE., light | None | 8 11.5 | | None | Pleasant. |
| | 12 p. m. | 41.8 | 60.0 | 41.8 | 44.0 | 30.58 | 4 | E., light | None | 8 11.0 | | None | Unsettled. |
| 27 | 6 a. m. | 42.0 | 45.7 | 40.5 | 44.0 | 30.56 | 10 | E., light | Mist | 8 10.5 | | None | Misty and raw. |
| | 12 m. | 52.5 | 56.7 | 41.8 | 44.5 | 30.55 | 4 | E., light | None | 8 10.0 | 144 | None | Cloudy and cool. |
| | 6 p. m. | 57.2 | 63.6 | 52.0 | 46.0 | 30.51 | 1 | ESE., light | None | 8 9.5 | | None | Pleasant. |
| | 12 p. m. | 46.4 | 60.3 | 45.6 | 44.0 | 30.56 | 8 | E., light | None | 8 9.0 | | None | Cloudy and cool. |
| 28 | 6 a. m. | 44.3 | 49.8 | 43.3 | 43.0 | 30.55 | 10 | Calm | None | 8 8.5 | | None | Overcast. |
| | 12 m. | 60.3 | 75.1 | 44.3 | 45.0 | 30.55 | 9 | S., light | None | 8 8.3 | 150 | Little | Pleasant. |
| | 6 p. m. | 56.8 | 75.0 | 56.4 | 44.5 | 30.50 | 9 | S., light | None | 8 8.0 | | None | Do. |
| | 12 p. m. | 46.9 | 59.2 | 46.9 | 44.0 | 30.51 | 10 | S., light | None | 8 7.5 | | None | Overcast. |
| 29 | 6 a. m. | 44.7 | 50.7 | 44.2 | 44.0 | 30.43 | 10 | Calm | Light | 8 7.0 | | Little | Rainy. |
| | 12 m. | 83.0 | 85.6 | 44.2 | 46.0 | 30.44 | 2 | Calm | None | 8 6.8 | 160 | Little | Pleasant. |
| | 6 p. m. | 59.6 | 86.8 | 58.7 | 46.0 | 30.44 | 1 | SW., light | None | 8 6.5 | | None | Do. |
| | 12 p. m. | 43.0 | 64.0 | 43.0 | 43.0 | 30.49 | 0 | Calm | None | 8 6.0 | | None | Do. |
| 30 | 6 a. m. | 40.8 | 47.6 | 38.4 | 44.0 | 30.44 | 5 | Calm | None | 8 5.5 | | None | Unsettled. |
| | 12 m. | 41.4 | 49.5 | 40.8 | 46.0 | 30.31 | 10 | SSE., moderate | Light | 8 5.0 | 150 | Little | Stormy. |
| | 6 p. m. | 47.3 | 51.1 | 40.3 | 46.5 | 30.18 | 10 | Calm | Mist | 8 4.8 | | Little | Misty. |
| | 12 p. m. | 44.4 | 50.7 | 42.4 | 45.5 | 30.28 | 0 | Calm | None | 8 4.5 | | None | Pleasant. |
| 31 | 6 a. m. | 47.7 | 50.8 | 40.0 | 46.0 | 30.35 | 2 | W., light | None | 8 4.0 | | Little | Do. |
| | 12 m. | 52.6 | 69.8 | 47.8 | 47.5 | 30.32 | 10 | SSE., light | None | 8 3.5 | 140 | Little | Unsettled. |
| | 6 p. m. | 48.8 | 57.9 | 44.8 | 48.0 | 30.15 | 10 | S., light | Moderate | 8 3.0 | | Little | Stormy and cold. |
| | 12 p. m. | 43.2 | 48.0 | 43.2 | 47.5 | 30.03 | 10 | Calm | Light | 8 2.5 | | None | Unsettled. |
| Aug. 1 | 6 a. m. | 44.5 | 47.8 | 43.0 | 48.0 | 29.96 | 10 | WSW., light | Heavy | 8 2.3 | | Little | Stormy. |
| | 12 m. | 56.1 | 64.7 | 44.1 | 48.5 | 30.10 | 10 | Calm | None | 8 3.0 | 130 | Little | Unsettled. |
| | 6 p. m. | 54.5 | 72.4 | 53.8 | 49.0 | 30.10 | 10 | SSE., light | None | 8 2.3 | | None | Do. |
| | 12 p. m. | 42.0 | 57.4 | 42.0 | 48.5 | 30.08 | 10 | NE., moderate | Light | 8 2.0 | | None | Stormy. |
| 2 | 6 a. m. | 44.7 | 47.8 | 41.7 | 48.5 | 29.78 | 10 | SSE., moderate | Heavy | 8 2.0 | | Little | Do. |
| | 12 m. | 44.2 | 50.1 | 44.0 | 48.0 | 29.81 | 10 | SSE., moderate | Light | 8 2.0 | 100 | Little | Do. |
| | 6 p. m. | 43.0 | 50.3 | 42.8 | 47.0 | 29.83 | 10 | SSE., moderate | Light | 8 1.5 | | None | Do. |
| | 12 p. m. | 41.5 | 46.0 | 41.5 | 47.0 | 29.85 | 10 | SSE., light | Trace | 8 1.3 | | None | Boisterous. |
| 3 | 6 a. m. | 42.3 | 46.4 | 40.5 | 47.0 | 29.75 | 10 | Calm | None | 8 1.0 | | None | Moderating. |
| | 12 m. | 50.0 | 53.5 | 42.5 | 48.0 | 29.78 | 9 | SW., light | None | (Demolition of rack commenced.) | | | Unsettled. |
| | 6 p. m. | 49.2 | 54.6 | 48.8 | 47.0 | 29.84 | 8 | SW., light | Trace | | | | Do. |
| | 12 p. m. | 42.0 | 52.2 | 42.0 | 44.0 | 29.97 | 10 | Calm | None | | | | Do. |

### SIGNIFICANCE OF WOOD RIVER DATA.

The spawning run up Wood River again shows a loss in comparison with the preceding season. The total was 670,000 in 1910, as against 893,000 in 1909. The commercial catch of Nushagak Bay also fell off, being 4,400,000 in 1910 as against 4,900,000 in 1909. The Wood River run in 1910 was 75 per cent of the 1909 run; the Nushagak Bay catch in 1910 was 89.8 per cent of the 1909 catch. Thus in each of these years the Wood River spawning run has declined much more rapidly than the catch in the bay has declined. The following table shows the numerical results in round numbers for the three years of Wood River investigations. The last column gives the sum of the bay catch and the Wood River run, this total constituting far the greater part of the whole run into Nushagak Bay.

SPAWNING RUN IN WOOD RIVER, 1908, 1909, AND 1910.

| Years. | Nushagak Bay catch. | Wood River tally. | Total. |
|---|---|---|---|
| 1908 | 6,400,000 | 2,600,000 | 9,000,000 |
| 1909 | 4,900,000 | 893,000 | 5,793,000 |
| 1910 | 4,400,000 | 670,000 | 5,070,000 |

The commercial catch for the whole bay has fallen off since 1908 by two annual losses of 1½ millions and ½ million, respectively. The corresponding loss to the Wood River tally was in 1909 numerically even greater than the loss on the catch, while in both 1909 and 1910 the percentage loss in Wood River was greater than on the catch.

According to observations in the river and the head of the bay, and the reports of the packers, the run up the main river was unusually large this season, evidently greater than the Wood River run. By taking the latter as a minimum and twice the number as a maximum for the main river run, and estimating otherwise on the same basis as in previous seasons, about 6,400,000 is obtained as the estimated run for the whole bay in 1910, which in view of the maximum error probable may be accepted as within one-half million of the actual run. Of this estimate over 79 per cent, or more than 5 million fish, are fish actually counted in Wood River by the observers and in Nushagak by the commercial fishermen.

The total escape to the spawning grounds for the whole Nushagak region during the current season lies between 25 per cent and 36 per cent of the total run, with 31 per cent probable. In other words, the industry took between 64 per cent and 75 per cent of the whole run, and probably took about 69 per cent.

As bearing on the rate of increase the figures for the season corroborate broadly the conclusions reached the year previously and tend

to narrow the limits between which this rate is indicated to lie. From such a slender basis of facts as are available, a rate of increase of from 200 per cent to 250 per cent is to be inferred if there is neither under nor overfishing. If these figures are too high the Nushagak industry is overfishing. If they are too low, fish are being uselessly wasted to the spawning grounds. The latter of these alternatives would hardly be maintained by anyone, and can hardly hold over a course of years, yet it may possibly be true of an occasional season, such as that of 1908.

*Value of a census of salmon runs.*—If the establishment of the increment percentage, rate of increase, or measure of the tendency of red salmon to multiply by their own natural and unaided reproductive powers is of any importance to the fisheries, then the Wood River investigations or their counterpart ought to be continued and made to include a complete salmon catchment basin, the larger and more isolated the better. It can hardly be maintained that the factors of temperature, wind, chance, etc., affect so erratically the movements of the great schools that the annual run to a given basin is little or not at all related to the preceding spawning runs which escaped capture therein. Salmon of course do not all return to the region where they were hatched. Some go elsewhere and a continuous flux or ebb and flow of interchange results.

But the number of the spawners inevitably measures the reproductivity. If this number could be ascertained for all Alaska, it would soon be known how prolific the salmon are. Since this is impossible it remains to make the determination on as large a section of the spawning grounds as can be handled. A somewhat longer time is required in order that the annual variations affecting the particular fragment of the fishery under observation shall reach an average making it representative of the whole. It matters little whether the adult salmon return to their parent waters, or whether they interchange freely, even to the extent of none returning to their birthplaces. The essential point is to determine how large are the runs which succeed year after year to a series of known spawning escapes.

As a matter of fact, there is much difference of opinion among fishermen respecting the controlling effect of winds on the movements of salmon. In Bering Sea few days pass without strong blows, and it is easy to relate the suddenly arriving salmon run to some particular wind, just as the so-called equinoctial storm is supposed to have some essential connection with the autumnal equinox. But whatever resultant physical influences have, they do not prevent an unfailing annual rush of hordes of red salmon into Nushagak Bay, their advent predictable almost to the day and their numbers expected with perfect certainty to be measured in millions. During the countless years in which this has occurred before the commercial fishery

existed the uniformity was presumably greater than at present. The variations in size of the run known to have occurred since man disturbed the balance of nature in these fisheries are reasonably due mainly to the exigencies of the commercial industry, which has been unable to make any correlation between its take and the quota necessary for spawning. Even with these variations, no such thing as a failure in the run is known to history or tradition. Even at the lowest ebbs of the commercial fishery the salmon had still to be counted by millions. As fisheries go, the Nushagak region and most of the Bristol Bay streams are constant and perennial sources of salmon.

That the determination of the rate of increase of red salmon, or the limits within which it varies, is a matter of high importance is self-evident. Of course a high rate has already been implied by the great productivity of salmon fisheries and their failure in Alaska to deplete rapidly under enormous drains. Presumably it has been known to many that the fishermen have been, in many fisheries, taking almost every year more than half the run. The lesser portion must therefore have reproduced the whole run, which placed the annual increment at over 100 per cent. Just how small this escaping portion may be and still reproduce a maximum run has been and is yet the vital and crucial question. But three long steps in answer have been taken by the three years of Wood River investigations.

There is no other way to obtain this increment percentage than by continued counting of the breeders, which, with the commercial catch, amounts to a census of the run. The three annual counts already made in Wood River, coupled with general knowledge of the other rivers of the bay, already show roughly what proportion of the Nushagak Bay run has reached the spawning grounds in these years, and since the Bering Sea fisheries are not rapidly declining this is probably not much below the proportion which should reach the spawning grounds.

This showing is definite enough to be safely used in a practical way as a basis for dividing the whole run into a commercial and a breeding quota. At the beginning the tentative figures might be 70 per cent for the former and 30 per cent for the latter. Seventy per cent is not far from representing the proportion of the run the industry has been taking from Nushagak Bay in each of the past two years. By the use of racks in the rivers the run could be divided as it came into alternate daily portions, one to escape, the other for the packers. Thus a definite proportion of the run would be insured to the spawning grounds, and the actual number of fish of which it consisted would be known. Even if a considerable inaccuracy existed in the tentative fixing of 30 per cent for the breeding quota, no injury would result, for the annual counts would constantly

correct the figures. It is only necessary to begin such a system of catching and releasing at proportions just to the industry and reasonably safe for the fisheries. It may be assumed for this purpose that a 30 per cent escape will approximately maintain the Nushagak fisheries. This implies a rate of increase of 233 per cent, which means that for three salmon which reach the spawning grounds, spawn, and die, ten adult salmon return during the next few years, and that if no more than seven of these are taken by the fishermen the process can continue indefinitely.

The Pacific salmon, and particularly the red salmon, alone among commercial fishes, are surprisingly adapted to the control of man for the purpose of perpetuation and exploitation as a commercial asset. They leave the sea regularly at a certain season and make their way en masse to the narrow channels of the fresh and more or less clear waters, where they may be confined, held, captured, or counted and released to the spawning grounds without injury—all with comparative ease and convenience. Spawning is definitely confined to the single season of sexual maturity and is soon followed by the death of the adult, so that breeding salmon never themselves become a part of subsequent runs. These facts make it possible not only to measure their reproductive power, but to put into effect a system of fishing whereby from a minimum reservation of breeding salmon the fishery may be maintained perpetually at a maximum. At the same time the industry may obtain its fish for packing easily and cheaply. The pack may be made in a perfectly fresh condition. The canneries can operate uniformly throughout the season, instead of with the present alternations of scarcity and abundance. Runs of more uniform size would finally succeed upon a more uniform release of breeders, and would therefore be more accurately predictable.

There is a certain quantity of seed represented by spawning salmon, a more or less definite fraction of the whole run, varying within presumably narrow limits, which nicely produces without waste from the spawning fields and the feeding grounds of the seas a maximum crop of fish. Any greater quantity is an excess, being a total waste of nonproductive seed, while any lesser quantity is a more serious loss, the waste of a multiplied return from potential seed which should have been used as such. No system of fishing can possibly make this measured sowing of the spawning grounds without actually counting the whole run. This the present system does not do. It counts the catch alone, and therefore it almost always wastes fish, either as nonproductive breeders or as the multiplied (by about $2\frac{1}{3}$) return from fish which should have been allowed to breed. The tendency is toward the latter or greater loss. Only occasionally and by chance will both forms of waste be avoided.

These opportunities which the peculiar specialized habits of the red salmon afford for perpetually exploiting them commercially without depleting their abundance should be utilized. The packing industry would greatly profit in the end and the Alaska fisheries would enhance in value as a national asset. At present the law does not provide power to establish such a system of fishing, but it would permit a trial in a suitable region by mutual agreement between the packers concerned and Federal authority.

### EXPLORATIONS OF LAKE ALEKNAGIK.

During the summers of 1908 and 1909 every stream tributary to Lake Aleknagik, which gives rise to Wood River, was examined by the agent. During the current summer Mr. W. T. Bower, of the Division of Fish Culture of the Bureau, spent the period from July 17 to July 27 in explorations of the lake and streams. By means of these observations the streams have been thoroughly prospected with reference to spawning salmon and hatchery possibilities. Two suitable and feasible hatchery sites have been selected, and on either a properly equipped expedition, arriving as soon as navigation opened, could erect a hatchery in time to obtain a portion at least of the same season's spawn.

Such a hatchery could be located on the lake shore and be accessible directly from tidewater for light-draft boats. No single stream of the lake would afford eggs enough to fill a large hatchery, and collections would have to be made over the whole lake in some seasons. There is, however, no more suitable location in the Bristol Bay region for accessibility and proximity to large spawning grounds. The second lake could be drawn upon for eggs if necessary. There is no hatchery in western Alaska, a region which furnishes some 63 per cent of the total pack of Alaska red.

### THE COD FISHERY.

All but one of the firms and individuals [John H. Nelson, of Squaw Harbor] operating in the district for cod exclusively have their headquarters at San Francisco, Cal., or Seattle, Anacortes, or Tacoma, Wash., at which places, or in their immediate vicinity, the cured fish are received and prepared for marketing. About half of the operators have shore stations located at favorable places in central Alaska, on the Shumagin and Sannak Islands, and Unimak Island. From thence the dory fishermen carry on their operations, bringing in their catch daily, and when they have accumulated enough to form a cargo a vessel is dispatched from the home port or else a fishing vessel completes its fare from the station catch and carries the fish to the curing establishments in the States.

The industry has suffered severely in the past from the spreading broadcast of exaggerated ideas as to its possible profits. As a result of this persons totally unfamiliar with the work have engaged in it, and instead of building up a trade by the preparation of a good product at a living price have prepared goods in a slipshod manner and then disposed of them by cutting below the prices of more reputable dealers.

When the present season opened the trade was in a demoralized condition, owing to excessive cutting of prices. During the summer certain changes in ownership took place. A new company, the Western Codfish Co., took over the plants, vessels, etc., of King & Winge Co. and the Seattle-Alaska Fish Co. The Union Fish Co., of San Francisco, bought and had delivered to it the catches of the vessels owned and operated this year by the Robinson Fisheries Co., of Anacortes, Wash., and the Blom Codfish Co., of Tacoma, Wash.

Through this centralizing of the industry, price cutting was eliminated, temporarily at least, and when this report closed the market was in excellent condition. A considerable surplus is on hand, but the dealers are content to hold this for their own price, which, owing to the shortage of cod on the Atlantic coast, they are reasonably sure of getting.

Mr. J. A. Matheson, of Anacortes, Wash., has incorporated his plant, and it is now known as the Matheson Fisheries Co. The Pacific States Trading Co., of San Francisco, which did not operate this year, will probably resume operations in 1911.

The winter of 1909–10 was severe, and the cod fishermen were very much hampered as a result. Up to June 1 heavy winds prevailed, and after that, while winds were light, heavy fogs were frequent. Owing to the severe weather practically no fish were caught in Dublin Bay.

On March 28 the codfish schooner *Stanley*, owned by the Union Fish Co., of San Francisco, Cal., when approaching Pavlof Harbor, on Sannak Islands, in central Alaska, grounded on a reef and immediately began to go to pieces. In the heavy seas continually breaking over her one man was washed overboard and drowned and three men, including the master, died from exposure before rescuing parties from the shore could reach the ship. The rest of the crew, five men, were saved. The vessel was carrying supplies to the company's shore stations in Alaska, and her loss seriously hampered the operation of these for several months.

## SHORE STATIONS.

During 1910 the following shore stations were operated: Alaska Codfish Co.: Unga, Baralof (Squaw Harbor), and Kelleys Rock (Winchester), on Unga Island; and Companys Harbor and Moffats Cove,

on Sannak Island. John H. Nelson: Squaw Harbor, Unga Island. Union Fish Co.: Pirate Cove, Popof Island; Northwest Harbor, Little Koniuji Island; Pavlof Harbor and Johnson Harbor, on Sannak Island; Sanborn Harbor, on Nagai Island; and Unga, on Unga Island. Several which were shut down this year will be operated in 1911.

## STATISTICS FOR CENTRAL ALASKA.

During the year 197 fishermen, 22 shoresmen, and 37 transporters were employed. The total investment amounted to $162,655. The catch amounted to 3,019,023 pounds of fish as taken from the water. When cured this weighed 2,269,914 pounds and sold for $63,443, a very large decrease from 1909.

PERSONS ENGAGED IN THE CENTRAL ALASKA COD FISHERIES IN 1910.

| Occupation and race. | Number. |
|---|---|
| Fishermen (shore fisheries): | |
| Whites | 197 |
| Shoresmen: | |
| Whites | 18 |
| Indians | 3 |
| Chinese | 1 |
| Total | 22 |
| Transporters: | |
| Whites | 37 |
| Grand total | 256 |

INVESTMENT IN THE CENTRAL ALASKA COD FISHERIES IN 1910.

| Items. | Number. | Value. | Items. | Number. | Value. |
|---|---|---|---|---|---|
| Transporting vessels: | | | Boats, sail and row | 197 | $5,950 |
| Steamers and launches | 3 | $28,000 | Apparatus: Hand lines | | 1,205 |
| Tonnage | 78 | | Cash capital | | 45,000 |
| Outfit | | 3,500 | Stations, with accessory property | | 39,500 |
| Sailing | 2 | 37,500 | | | |
| Tonnage | 235 | | | | |
| Outfit | | 2,000 | Total | | 162,655 |

PRODUCTS OF THE CENTRAL ALASKA COD FISHERIES IN 1910.

| Products. | Round weight. | Dressed weight. | Value. |
|---|---|---|---|
| | *Pounds.* | *Pounds.* | |
| Cod, fresh | 16,000 | 14,000 | $560 |
| Cod, salted | 2,877,157 | 2,157,914 | 59,433 |
| Cod, pickled | 125,866 | 94,400 | 3,320 |
| Cod tongues, salted | | 3,600 | 130 |
| Total | 3,019,023 | 2,269,914 | 63,443 |

### VESSEL FISHING.

The following fleet[a] of 11 vessels, with headquarters in California and Washington, operated in Alaskan waters this year, several of them spending the winter of 1909–10 in the north.

COD-FISHING FLEET IN ALASKAN WATERS, WINTER OF 1909–10.

| Name. | Class. | Net tonnage. | Owner. |
|---|---|---|---|
| Fanny Dutard | Schooner | 252 | Matheson Fisheries Co., Anacortes, Wash. |
| Alice | do | 220 | Robinson Fisheries Co., Anacortes, Wash. |
| Joseph Russ | do | 235 | Do. |
| Maid of Orleans | do | 171 | Seattle-Alaska Fish Co., Seattle, Wash. |
| Vega | do | 233 | King & Winge Codfish Co., Seattle, Wash. |
| Fortuna | do | 138 | Blom Codfish Co., Tacoma, Wash. |
| W. H. Dimond | do | 376 | Alaska Codfish Co., San Francisco, Cal. |
| City of Papeete | Barkentine | 370 | Do. |
| John D. Spreckles | Schooner | 253 | Do. |
| Fremont | do | 328 | Union Fish Co., San Francisco, Cal. |
| Stanley[a] | do | 253 | Do. |

[a] Lost at sea.

The vessels from Washington operating in Alaskan waters caught 911,500 fish, with a cured weight of 3,563,000 pounds, which sold for $97,983, while those from California caught 498,399 fish, with a cured weight of 1,992,000 pounds, valued at $54,780.

## THE HALIBUT FISHERY.

### FISHING GROUNDS.

The fishery for this very choice food fish occupies second place in the commercial fisheries of Alaska. At present the industry is practically restricted to southeast Alaska, the few fish taken in central Alaska being consumed in the towns in that section. This is due almost wholly to the fact that the present steamship facilities to this section of Alaska are inadequate for the handling of this species as expeditiously as is required. Halibut are reported from various places in Cook Inlet, from all along the Alaska Peninsula and the adjacent islands, and in Prince William Sound.

In western Alaska the fish is reported from a number of places, the natives usually catching and using it for food. The natives of the Pribilof Islands, when fishing off the islands, catch numbers of halibut and these are usually very choice specimens.

In southeast Alaska halibut appear to be most abundant in the numerous sounds and straits during the winter months. Icy, Chatham, Peril, and Sumner Straits, and Frederick Sound are the chief centers of abundance. The best grounds are to be found in Frederick Sound, especially around the Five Finger Islands. Good banks are to be found scattered all over Icy Straits. The waters of

[a] None of the data relating to this fleet appear in the statistical tables.

Chatham Strait are too deep for general fishing, but off Point Gardiner and at several spots off Baranof Island, are to be found good fishing banks, while Kootznahoo Inlet, on Admiralty Island, yields good fishing in summer. In Sumner Strait are to be found very good deep-water winter fishing grounds. During the winter of 1909–10 some of the fishermen fished here in water as deep as 250 fathoms. The vicinity of the Eye Opener is the best ground to be found in the strait. Indians fish considerably in Boca de Quadra and the vicinity of Kah Shakes Cove, Mary's Island, and the mouths of Kasaan Bay and Cholmondeley Sound. In Stephens Passage considerable fishing is done in and just off the mouth of Seymour Canal. Most of the fishing in the protected waters of southeast Alaska has heretofore been done in winter, as the fish were then most abundant and the prices realized were better than in summer when the Puget Sound fleet operates on the Flattery Banks, off the Washington coast, and brings the fish in in such abundance that the Alaska-caught fish, which have to be shipped on the steamers plying between Seattle and southeast Alaska ports, at considerable expense, can not compete. This summer, however, the New England Fish Co. bought and froze all halibut brought to its Ketchikan plant and as a result a number of fishermen continued halibut fishing throughout the year.

For many years the Puget Sound steamers and large power vessels fished in Hecate Strait and off the chain of islands lying outside the British Columbia mainland. During the last few years these banks have been growing less and less productive, and as the Canadian fishery protection boats have very much harassed our fishermen who were operating in these waters, or who were driven into its harbors by stress of weather or for wood and water, they have been gradually extending their operations northward into Alaska waters, where they would be free from molestation. It has been known for some years that halibut were abundant at certain regions in the ocean off the outer fringe of islands in southeast Alaska, more particularly off Baranof Island and the mainland between Cape Spencer and Yakutat Bay, and it was surmised that other and possibly more extensive banks would be found if looked for. During the winter of 1909–10 several of the vessels prospected the open waters between Cape Muzon and Sitka, with the result that halibut were found in great abundance throughout the greater part of this area. Off Forrester Island seemed to be the center of greatest abundance. Here an average depth of 80 fathoms is found for about 4 miles from shore; a little farther out it deepens to 150 fathoms. The first few cargoes from here averaged 15 pounds to the fish, but the average soon dropped to 14 pounds. One steamer early in July caught about 250,000 pounds of halibut on the Forrester Island banks during one trip.

Halibut frequent the sandy banks on which coral and a small shellfish known to the fishermen as "sea cocks" abound. The latter is sought by the halibut as a choice morsel of food. The fish is a very voracious and promiscuous feeder. The stomach of one opened at the Ketchikan plant of the New England Fish Co. contained an octopus, a crab, a salmon, and a dogfish. Sand launce and fish eggs of a large size appear to be its favorite food at certain seasons. One dealer reports finding a 6-inch section of a tree branch in the stomach of one. The fishermen say that frequently when pulling up a hooked halibut, other halibut will follow the hooked one to the surface, biting at its tail and body.

A few female halibut with roe reach the dealers, but the fish are usually dressed on the banks, and the roe, when present, is thrown away. Several fish with roe were received by the New England Co. in August and September.

## METHODS AND CONDITIONS.

Within the protected area in summer the fish are scattered considerably, but during the winter they school on banks in the waters noted above. During this season the greater part of the year's catch is made by the smaller vessels, which are unable to stand the rough weather usually encountered on the banks in the open ocean.

Dealers located at Hoonah, Juneau, Douglas, Scow Bay, Petersburg, Wrangell, and Ketchikan handle the fish from the fishing boats. Scow Bay, which is on Wrangell Narrows, about 5 miles from its head, is the principal shipping point. Here are moored several large house scows, floats, and barges, alongside of which the fishing boats tie up and deliver their catch, to be boxed in ice for shipment and put aboard the regular steamers for Seattle, which pass through the narrows every few days. The fish are cleaned and packed in ice in bins aboard the vessel on the banks. The fishermen furnish their own ice, which is frequently secured from icebergs which have broken off from nearby glaciers and are floating around in the bays, sounds, and straits. The dealer furnishes the shooks for making the boxes, which hold about 500 pounds. Where glacier ice is not available the fishermen buy from the artificial ice plants, paying from $3 to $5 per ton.

A few years ago halibut weighing over 50 pounds were usually fletched aboard the vessel, but the demand for fletched halibut is so small, and the price realized is so inadequate to the work involved, that but few are now prepared in this manner, and these usually on shore. In fletching the sides are taken off in two complete pieces, which are then put into bins and buried in salt so that the brine will run off. It usually requires about three weeks for the fish to strike properly. Half-ground California salt is used in curing.

In shipping fresh, the best fish are from 25 to 30 pounds in weight. A 10-pound fish is quite a small one. Those smaller are known as "chickens." Most of the Alaska halibut are of good grade. But few logy halibut are found; that is, with watery flesh which clings to the knife when cut and does not have the blue tint of the first-class fish.

Sometimes the dealer makes a contract with a vessel owner at a certain fixed figure, but when the fish are received on consignment the commission charged is generally 5 per cent. The dealers usually purchase outright, at the current rates, the fish landed by the small boats.

Large halibut are occasionally taken, one being delivered at Juneau in 1904 which weighed 365 pounds. According to the fishermen the females appear to have well developed eggs at any season of the year.

Shooks for making a halibut box cost from 65 to 70 cents for each box, depending upon the quantity ordered. The only other expense is for nails and the labor required in making the box. The fishermen deliver the halibut at the scows in an eviscerated condition. When being packed for shipment the head is removed and the fish thrown into the box with the tail toward the middle. Under ordinary conditions 1 ton of ice is required for 6 tons of fish, which is quite reasonable when it is taken into consideration that the fish must be carried a distance of over 700 miles by steamer. The freight rate to Seattle varies from $7 to $7.50 per cubic ton, depending upon the distance of the shipping point from Seattle. For shipments of less than 6 boxes the rate is somewhat higher. In addition wharfage has to be paid in Alaska (usually about $1 per ton) and in Seattle (40 cents per ton). Six boxes of fish are considered to weigh 2½ tons.

The greater portion of the Pacific coast halibut is shipped to points east of the Mississippi River, Chicago, New York, and Boston being the principal distributing centers. The demand from the Pacific coast and adjacent States, however, is showing a healthy growth, and will eventually absorb the greater part of the catch.

Heretofore the vessels of the New England Fish Co. have operated from the company's plant in Vancouver, British Columbia, the fish landed from the vessels with American register having been shipped through to places in the United States in bond, free of duty. Since the establishment of the company's station at Ketchikan these steamers have virtually made this place their headquarters and have been so credited in this year's report.

On December 29, 1909 (too late to be included in the report for that year), as the gasoline schooner *Capella* was being towed from Wrangell to Petersburg by the gasoline boat *Neptune*, the latter broke down and both vessels drifted onto the northeast shore of

Vanks Island. The *Capella* became a total wreck, and her master and a sailor lost their lives from exposure and exhaustion after reaching land.

On November 13 the gasoline schooner *Sea Light*, of Ketchikan, while on a halibut fishing cruise, was wrecked at Larch Bay, near Cape Ommaney, in southeast Alaska, during a severe gale. After suffering much hardship the crew of 8 men managed to reach safety in their dories. Later the vessel was found on the beach by another fishing vessel which worked her off and towed her into Petersburg.

## STATISTICS.

During the year 1910 there were 829 persons employed in all branches of the halibut industry. The number of steamers and launches increased enormously over 1909, because of the highly remunerative prices realized for halibut the previous year. The catch as reported in 1910 amounted to 21,579,289 pounds, valued at $808,010, as compared with 5,189,924 pounds, valued at $195,529 in 1909. Part of this great increase in showing is due to the changing of the headquarters of the New England Co.'s fleet of steamers from Vancouver, British Columbia, to Ketchikan, thus bringing them within the scope of this report.

PERSONS ENGAGED IN THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1910.

| Occupation and race. | Number. | Occupation and race. | Number. |
|---|---|---|---|
| Fishermen: | | Shoresmen: | |
| Vessel fisheries— | | Whites | 29 |
| Whites | 343 | Indians | 2 |
| Indians | 34 | Total | 31 |
| Total | 377 | Transporters: | |
| Shore fisheries— | | Whites | 1 |
| Whites | 240 | Grand total | 829 |
| Indians | 180 | | |
| Total | 420 | | |

INVESTMENT IN THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1910.

| Items. | Number. | Value. | Items. | Number. | Value. |
|---|---|---|---|---|---|
| Fishing vessels: | | | Scows | 5 | $7,600 |
| Steamers and launches | 66 | $468,800 | Apparatus: | | |
| Tonnage | 842 | | Vessel fisheries, trawl lines | | 22,080 |
| Outfit | | 165,049 | Shore fisheries, trawl lines | | 15,870 |
| Sailing | 3 | 3,800 | Cash capital | | 52,500 |
| Tonnage | 35 | | Shore and accessory property | | 252,200 |
| Outfit | | 875 | | | |
| Packing barges | 1 | 15,000 | Total | | 1,258,004 |
| Tonnage | 338 | | | | |
| Launches under 5 tons | 151 | [a] 253,330 | | | |
| Boats, sail and row | 20 | 600 | | | |

[a] Outfit included.

PRODUCTS OF THE SOUTHEAST ALASKA HALIBUT FISHERIES IN 1910.

| Products. | Round weights. | Dressed weights. | Value. |
|---|---|---|---|
| Vessel catch: | *Pounds.* | *Pounds.* | |
| Halibut, fresh | 18,251,519 | 14,601,215 | $702,245 |
| Halibut, frozen | 2,343,644 | 1,876,915 | 69,871 |
| Halibut, fletched | 66,560 | 49,920 | 2,259 |
| Total | 20,661,723 | 16,528,050 | 774,375 |
| Shore catch: | | | |
| Halibut, fresh | 786,482 | 645,186 | 29,669 |
| Halibut, frozen | 123,481 | 98,785 | 3,677 |
| Halibut, fletched | 7,333 | 5,500 | 275 |
| Halibut, pickled | 270 | 200 | 14 |
| Total | 917,566 | 749,671 | 33,635 |
| Grand total | 21,579,289 | 17,277,721 | 808,010 |

In Central Alaska 51,000 pounds, valued at $2,040, was marketed in addition to above.

### PUGET SOUND FISHING FLEET.

A fleet of Puget Sound power vessels visits southeast Alaska during the months from October to March, when, owing to stormy weather and a scarcity of fish, it is not safe nor profitable to visit the banks near the home ports. This fleet makes its headquarters mainly at Petersburg, at the head of Wrangell Narrows, shipping the catch home from Scow Bay, near by, via the regular steamship lines. A few rendezvous at Ketchikan and Juneau. This fleet was composed of 60 vessels, valued at $782,230, employed 1,800 men, and used trawls valued at $70,850. As a result of its operations in Alaska the fleet (with the exception of the steamers) caught and shipped 3,531,644 dressed pounds (the round weight of this catch or the weight of the fishes taken from the water was approximately 4,414,555 pounds), valued at $158,260. The steamers carry their own catches to the Sound ports and these have not been included in the above amount. During the summer months most of this fleet fishes on the Flattery Banks off the State of Washington, or else off the British Columbia coast.

## THE HERRING FISHERY.

### ABUNDANCE OF FISH.

At times herring are quite abundant along the coasts of southeast, central, and western Alaska. At Captains Harbor, on Unalaska Island, they appear twice each year, in July and September. Residents of Port Heiden, in Bering Sea, report that large schools visit that bay in the spring and fall, and there is said to be a large annual run at Atka Island. Herring are quite abundant in Port Clarence also, and some fishermen located at Grantley Harbor, near the head of

this bay, have been salting on a small scale during the past three or four years and selling the fish at Nome and the various settlements in that section of Alaska. The schools generally visit Cook Inlet, in central Alaska, from July to October, and these fish are the largest and finest found in Alaskan waters. In southeast Alaska herring are found in varying abundance in almost every bay, strait, and sound.

According to the best information obtainable, the herring in southeast Alaska begin to spawn during April or May and continue in some localities as late as July 1. Immediately after spawning the fish school in great abundance out in deep water, especially in Frederick Sound and the southern end of Stephens Passage, and then reenter the bays for the purpose of feeding. During July and August they are filled with red feed (certain species of small crustaceans) which makes them very difficult to cure. In September and October apparently they change their food, for the red feed is not then noticeable in their stomachs, and at this time they are in their prime. The runs are usually composed of mixed sizes, although in early summer there are said to be numerous bays where all the herring will be of small size. In western Alaska, according to Nelson, the herring spawn in the neighborhood of St. Michael in June.

> At this time these fish form a continuous line along the beach, passing from south to north in unbroken succession, spawning on the seaweeds and rocks from above low-tide mark to a fathom below it. They enter all the inner bays and swarm about every reef and rocky point. The water boils with them along shore as they struggle about in a dense mass among the short seaweed in spawning, and they can be easily caught in one's hands. The females move slowly among the weeds, and press in the midst of them, depositing their eggs, which adhere to whatever they come in contact with, by means of a gummy secretion with which they are coated. Thrusting my hand under water for a half minute was sufficient for it to be covered with eggs.[a]

In southeast Alaska during the spawning season, the natives place spruce boughs in the water, and after the eggs have adhered, remove the boughs and dry the eggs in the sun, using them later as food. In this way many thousands of eggs are destroyed each season. This practice should be prohibited by law.

### USES FOR FOOD AND BAIT.

Unfortunately, but little commercial use is made of herring as a food fish in central, western, and arctic Alaska. In 1907 a herring saltery was established on Simeonof Island, one of the Shumagin group, in central Alaska. Owing to the low prices realized for the prepared product, and the high cost of transportation, the plant was closed down in 1908 and 1909, but it was reopened this year. A small quantity is marketed fresh, but the great bulk of the catch is made by the Indians, who consume the fish, either fresh or after being dried.

[a] Report upon Natural History Collections made in Alaska between the years 1877 and 1881, by Edward W. Nelson, p. 320-21 (1887).

In southeast Alaska the fishery has attained to considerable prominence. Here herring are sold fresh and salted for food; but the principal use is as bait in the halibut and king salmon fisheries and as fertilizer and oil. In baiting, fresh herring are used whenever possible; but when the fisherman has to hold them for a few days the herring are usually dumped round into a barrel with enough salt to preserve them until needed. There is also a demand from the States for the larger herring for smoking purposes, and each season a few dressed and rolled in salt are packed in halibut boxes holding about 500 pounds, and shipped.

Several inquiries were received this year from Seattle and San Francisco brokers and commission men in regard to supplying salted herring for the China trade, and it is to be hoped that some business in this line will eventuate.

Each season there are many complaints from the halibut fishermen as to the scarcity of herring and the heavy loss sustained through the boats being tied up for days at a time owing to the lack of bait. The question of a constant and abundant supply of bait is, in fact, the most serious problem confronting the halibut fishermen. During the summer months halibut fishing is carried on in a desultory manner; but about the middle of September the fleet from Puget Sound arrives, and this, joined with the local fleets, soon causes a tremendous demand for herring, which is the only bait used in the fishery to any extent. The matter is still further complicated by the erratic behavior of the herring itself, which may appear in countless numbers in a certain bay one year, while the next year there may not be one.

The most feasible method for overcoming this handicap would be by the establishment of small freezers at Wrangell, Scow Bay or Petersburg, Juneau, and Hoonah, where herring could be received from the fishermen during the summer and early fall, when most abundant, and frozen and stored away until needed in the late fall and winter. The New England Fish Co., at its Ketchikan plant, freezes a large quantity of herring each year, which it supplies to its own steamers and to the smaller vessels which deliver their catches of halibut at its plant.

## THE FERTILIZER QUESTION.

The use of herring in the manufacture of fertilizer and oil as conflicting with its use by man directly as a food and bait fish, and indirectly through the dependence of the valuable king salmon fishery upon it as food material, gives rise to a somewhat puzzling question of right and administrative policy. The present fisheries law does

not prohibit such use of food fishes, and there is now one plant—that of the Alaska Oil & Guano Co., at Killisnoo, in southeast Alaska—engaged in the industry. This year this plant caught 59,000 barrels of herring, with an aggregate weight, roughly, of 11,800,000 pounds. Of these all but 130 barrels, which were pickled for use as bait, were converted into fertilizer and oil.

It is easy to conceive of commercial uses to which fishes are put which take precedence over other uses with respect to public advantage. Thus the manufacture of fertilizer and oil from fishes is a lower use, inferior to the business of preparing food products from fishes, or even to their use as bait for food fishes. Thus the menhaden ranks lower than the herring. Such a view in part grows out of the fact that these fertilizer and oil products, quite legitimate in themselves, do not depend entirely on fishes for their raw material. Furthermore even fish fertilizer and fish oil do not depend upon the herring, for various nonedible fishes, as the menhaden, are available. The general view of a higher use denoted by the appropriation of fishes for human food has widely obtained and is evidenced by various legislation prohibiting the lower use where it has conflicted with the higher. The dependence of a highly prized food fish and a correspondingly valuable fishery upon another fish as food for the former, as in the case of the king salmon upon the herring, may be classed with the higher uses. This in fact is one of the most important aspects of the value of the herring fishery, if not its chief use. An important food of the king salmon is herring, and as the catching of king salmon by trolling now forms one of the most important and profitable of the fisheries of southeast Alaska, no condition that adversely affects it in a material degree should exist unless by the justification of a paramount right and importance.

In the absence of a material higher use the manufacture of the lower products is to be commended, in so far as it causes no depletion, as making a legitimate use of fishes which would otherwise go to waste. Certainly were there no other demand for the herring, such a use should be encouraged. The king salmon of course makes a continual demand upon it, and the king salmon fishery is a permanent one. Even the satisfaction of this demand might perhaps leave a margin of the natural increase of herring for other uses.

Other things being equal it is of course the operation of the law of supply and demand which will determine what use shall be made of commercial fishes, the product being prepared for sale in the highest market. Under such circumstances the matter of use might be left to competition which would exploit the fishery for its most profitable end. Perhaps no such legitimate use could be regarded as indefensible, though lower from some standpoints, but without

discussing this question it may suffice to point out that equality of conditions in practice soon ceases to exist, as is the case with the present herring fishery in Alaska. An established industry with plants and special machinery might continue a less profitable use on account of its possession of facilities and the loss involved in change or abandonment, and make thereby serious inroads upon a supply which would otherwise actually be taken for food uses. It would then seem the part of justice to prohibit the lower use after such time or under such conditions as would secure the interdicted industry from serious loss.

The practice evidently has been, with the approval of public sentiment concerned, to make legislative choice as between material conflicting uses on the general grounds of higher and lower uses, as already discussed. In the concrete instance of the Alaska herring fishery, although some demand an immediate ban on its manufacture into fertilizer and oil, it is not clear that a material conflict of interests exists. As a matter of fact, owing to distance from market, high freights, and the necessity for competing with the British Columbia and Puget Sound packers, the Alaskan herring has not made its way to any great extent as a food fish. As bait for the halibut fishery it is in great demand, but when most needed the herring run is usually small, and the salted herring, while used, is inferior as bait. Both the food and bait uses combined consumed only about 20 per cent of the take in 1910, a season of abundance of herring. The rest was manufactured into fertilizer and oil. Certainly an exigent demand for herring for other purposes could have been met to a larger extent from the large run of the current season.

It is for the future rather than the present that it is desirable to take action looking toward the end of the use of herring as the raw material for fertilizer and oil. It is safe to assume that all the uses of the herring are destined to increase, and therefore at some future time a conflict of uses is probably inevitable. There is but one establishment engaged in the fertilizer and oil industry in Alaska. To prevent extensions of the business and provide for its termination without injury to existing interests it is only necessary to prohibit it by legislation effective at a future date, allowing ample time for the present concern to wind up its affairs. The Bureau has already through the Department recommended to Congress an early tentative date, in part for the sake of eliciting the facts on which to base a reasonable interim. Evidence has been taken on both sides of the question and a common ground reached for a settlement of the question which is believed to be just for all concerned. It is maintained and conceded that the continuance of the herring fertilizer and oil industry is likely to become inconsistent with public policy

respecting the fisheries. The Department on the other hand is inclined to allow a liberal term before any prohibition upon the industry shall become effective, and upon the fixing of this term the question may be said to pend. A few years' delay in the inauguration of this change, intended to hold indefinitely, is a matter of little moment to the fisheries, but of imminent importance to the industry.

## STATISTICS.

The following tables show the condition of the herring industry in 1910:

PERSONS ENGAGED IN THE ALASKA HERRING FISHERIES IN 1910.

| Occupation and race. | Southeast Alaska. | Central Alaska. | Total. |
|---|---|---|---|
| Fishermen: | | | |
| Vessel fisheries— | | | |
| Whites | 59 | ..... | 59 |
| Indians | 4 | ..... | 4 |
| Japanese | 4 | ..... | 4 |
| Total | 67 | ..... | 67 |
| Shore fisheries— | | | |
| Whites | 30 | 9 | 39 |
| Indians | 5 | ..... | 5 |
| Total | 35 | 9 | 44 |
| Shoresmen: | | | |
| Whites | 35 | 2 | 37 |
| Indians | 31 | 2 | 33 |
| Japanese | 6 | ..... | 6 |
| Total | 72 | 4 | 76 |
| Grand total | 174 | 13 | 187 |

INVESTMENT IN THE ALASKA HERRING FISHERIES IN 1910.

| Items. | Southeast Alaska. | | Central Alaska. | | Total. | |
|---|---|---|---|---|---|---|
| | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* |
| Fishing vessels: | | | | | | |
| Steamers and launches | 5 | $32,300 | ..... | ..... | 5 | $32,300 |
| Tonnage | 182 | ..... | ..... | ..... | 182 | ..... |
| Outfit | ..... | 12,000 | ..... | ..... | ..... | 12,000 |
| Launches, under 5 tons | 6 | 10,000 | 1 | $1,200 | 7 | [a] 11,200 |
| Boats, sail and row | 42 | 2,470 | 4 | 400 | 46 | 2,870 |
| Scows | 4 | 2,100 | 1 | 300 | 5 | 2,400 |
| Apparatus: | | | | | | |
| Vessel fisheries— | | | | | | |
| Purse seines | 10 | 3,995 | ..... | ..... | 10 | 3,995 |
| Shore fisheries— | | | | | | |
| Haul seines | 1 | 75 | 3 | 400 | 4 | 475 |
| Purse seines | 9 | 1,495 | ..... | ..... | 9 | 1,495 |
| Gill nets | 1 | 500 | ..... | ..... | 1 | 500 |
| Cash capital | ..... | 80,000 | ..... | 2,000 | ..... | 82,000 |
| Shore and accessory property | ..... | 50,800 | ..... | 5,000 | ..... | 55,800 |
| Total | ..... | 195,735 | ..... | 9,300 | ..... | 205,035 |

[a] Includes outfit.

PRODUCTS OF THE ALASKA HERRING FISHERIES IN 1910.

| Products. | Southeast Alaska. | | Central Alaska. | | Total. | |
|---|---|---|---|---|---|---|
| | *Quantity.* | *Value.* | *Quantity.* | *Value.* | *Quantity.* | *Value.* |
| Herring, fresh, for food.....pounds.. | ..... | ..... | 10,000 | $300 | 10,000 | $300 |
| Herring, fresh, for bait.....do.... | 574,359 | $5,203 | ..... | ..... | 574,359 | 5,203 |
| Herring, frozen, for bait.....do.... | 522,500 | 5,225 | ..... | ..... | 522,500 | 5,225 |
| Herring, pickled, for food...barrels.. | 979 | 9,056 | 216 | 1,728 | 1,195 | 10,784 |
| Herring, pickled, for bait.....do.... | 1,906 | 3,199 | ..... | ..... | 1,906 | 3,199 |
| Herring, salted, for food.....pounds.. | 45,600 | 954 | ..... | ..... | 45,600 | 954 |
| Herring eggs, dried, for food...do.... | 1,000 | 100 | ..... | ..... | 1,000 | 100 |
| Herring fertilizer.....do.... | 2,617,000 | 40,000 | ..... | ..... | 2,617,000 | 40,000 |
| Herring oil.....gallons.. | 277,000 | 55,000 | ..... | ..... | 277,000 | 50,000 |
| Total..... | ..... | 113,737 | ..... | 2,028 | ..... | 115,765 |

## FERTILIZER AND OILS.

The only plant operated this year for the preparation of fertilizer and oil from fish was that of the Alaska Oil & Guano Co. at Killisnoo, in southeast Alaska. During the fishing season the company's vessels caught 59,000 barrels of herring, as compared with 52,000 barrels of herring and 3,846 barrels of salmon in 1909.

The Revilla Reduction Works have constructed a plant for the treatment of dogfish and mud shark livers at Ketchikan, in southeast Alaska. While the plant is primarily for the extraction of oil from the livers, it is also hoped by the owners to be able to dry-salt the flesh for shipment as food to China and Japan, and to dry the skins for sale. Unfortunately the flesh so far treated has turned yellow and brown, and until this fault can be corrected it will be of little value. The plant was completed so late in the season that practically nothing was done this year.

## THE CRAB FISHERY.

As stated in previous reports, crabs are exceedingly abundant in nearly every section of Alaska, but it is only in southeast Alaska that they are put to any considerable commercial use, many being consumed locally, while large numbers are shipped to the Puget Sound markets, and a few to points in the Northwest Territory, Canada.

The principal shipping places are Petersburg and Wrangell, and the fishermen from here crab on the flats in Dry Straits, opposite Ideal Cove, and at Scow Bay, in Wrangell Narrows. They use a rectangular pot of wooden framework, about 40 inches long, 18 inches high, and 30 inches wide, with $3\frac{1}{2}$-inch stretch mesh net covering. The tunnels, of which there is one at each end, are 7 inches in width and 5 inches in height. These pots cost about $3 each.

The pots are set on trawls, about 25 or 30 to a trawl. Each is attached to a gangion about 5 fathoms long, thus permitting the raising and emptying of the pot without bringing to the surface the trawl itself. The trawls are marked by buoys and held by anchors.

On some of the trawls baited hooks are placed between the gangions for the purpose of catching bait for the pots. All sorts of fish, clams, etc., are used as bait.

When fishing the pots the fishermen throw back into the water all crabs under 6 inches in width, measured the broad way of the back, all females, and the soft-shell ones, the latter because there is usually very little meat in them.

At first the crabs shipped out of the district were packed alive in seaweed, but so many died on the way or arrived in bad condition that now all are boiled before being shipped. The shippers classify them as follows: Large, 7 inches and over; medium, 6½ to 7 inches; and small, 6 to 6½ inches. The prepared crabs are packed in boxes holding between 12 and 14 dozen each, and are set on their bottoms in three tiers with layers of ice at the bottom, between each tier, and at the top. The freight to Seattle is $7.50 per measured ton, which would include 35 dozens of crabs.

There is ample room for a large development of this industry, both in canning and marketing fresh, and it is probable this will take place as soon as knowledge of the abundant supplies to be had in Alaska becomes more general.

## THE WHALE FISHERY.

The only shore whaling station in the United States where all the parts of a whale are utilized is at Tyee, at the lower end of Admiralty Island, in southeast Alaska, and this plant was operated more vigorously than ever this year. In addition to the steamer *Tyee, Junior,* and the gasoline schooner *Lizzie S. Sorrenson,* which composed the fleet in 1909, the steamer *Fearless* (85 net tons) was fitted out this year. In order to permit the fleet to operate more freely in the open ocean, where most of the whales are now killed, the bark *Diamond Head,* loaded with supplies of coal, gasoline, provisions, etc., was anchored in a convenient bay, to which the fleet could resort when in need and thus save the long trip to the station except when necessary to tow the catch there.

The *Lizzie S. Sorrenson* early in the season met a most unusual fate. As she was cruising around in the ocean about 8 miles southwest of Cape Addington the evening of May 10 a whale was sighted. She was cautiously worked to within gunshot and a harpoon driven into the animal. The weapon failed to reach a vital spot, and the whale made off at a terrific rate, but finding its progress checked it suddenly turned and charged directly at the vessel. Unavailing efforts were made by the crew to work the ship out of the way of the infuriated creature, and the whale, striking her a terrific blow in the stern, knocked out a portion of the bottom. Efforts made to plug the hole were without success, and as the pumps did not suffice, the crew took

to their boats and the vessel soon sank. Two days later the shipwrecked crew was picked up by the whaler *Fearless*.

The station fleet secured 146 whales, of which 6 were sperm whales and one a right whale. As the sperm and right whales produce more valuable by-products than the ordinary whales secured here, the financial return this year was better than in previous seasons. Since the fleet began fishing in the open ocean, moreover, a greater number of sulphur-bottom whales, which are the largest, have been secured, thus adding materially to the output of the station with but slight addition to the cost of operating in the interior waters. It is probable that the plant will be removed to a spot nearer the present scene of operations in order to eliminate the time and expense now necessary in order to get the killed whales from the grounds to the station.

There are a number of shore whaling stations along the Arctic shores of Alaska, at Cape Smythe, Point Hope, and Point Barrow. These stations are quite different affairs from the shore whaling station at Tyee, in southeast Alaska, being virtually trading stations which, in addition to their regular mercantile business, furnish the capital to outfit Eskimos who wish to hunt whales in the ocean close to shore. When a whale is killed the whalebone is removed and sold to the trader, while the natives eat or preserve as food as much of the blubber and flesh as they feel will be required to support them through the long winter. At Cape Smythe there are about 19 boats whaling, at Point Hope about 22, and at Point Barrow about 36 boats. The crews average about 8 men to a boat and the darting gun is quite generally used. The season lasts about 2 months, and comprises a part of April, all of May, and a part of June. The bone shipped out from these stations appears in the statistical tables.

Owing to the glut in the whalebone market, but few of the Arctic fleet operated this year. The fleet comprised the following: Steamer *Herman* (229 net tons), steamer *Karluk* (247 net tons), brigantine *Jeanette* (217 net tons), schooner *Rosie H.* (69 net tons) which went north in 1908, gasoline schooner *Confianza* (84 net tons), and the schooner *Lettitia* (233 net tons). The gasoline schooner *Olga* (43 net tons) sailed north in 1908 and was wrecked in the Arctic late in 1909, the news not coming out until this year. While whales were plentiful they were excessively shy and hard to approach. The fleet secured 27 whales, the *Karluk* alone taking 21, which however, represents two seasons' work on the part of the *Karluk*, she having spent the winter of 1909–10 in the North.

## FURS.

Except in the case of fur seals and sea otters, no effort has heretofore been made to conserve the supply of fur-bearing animals of the district, but "An act to protect the seal fisheries of Alaska, and for

other purposes," approved April 21, 1910, consigns these resources to the charge of the Department of Commerce and Labor.

In accordance with section 4 of this law a set of regulations have been promulgated by the Secretary of Commerce and Labor, as given in full in the appendix to this report (p. 71).

The following table shows the number and value of furs of all kinds shipped from Alaska in 1910:

SHIPMENT OF FURS FROM ALASKA IN 1910.

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* | *No.* | *Value.* |
| Bear, black | 478 | $4,935 | 326 | $3,085 | 532 | $3,821 | 1,336 | $11,841 |
| Bear, black, stuffed | 1 | 20 | | | | | 1 | 20 |
| Bear cubs, black, alive | | | 4 | 125 | 2 | 10 | 6 | 135 |
| Bear, black, skulls | | | | | 1 | 10 | 1 | 10 |
| Bear, blue | | | 2 | 50 | | | 2 | 50 |
| Bear, brown | 4 | 75 | 27 | 1,285 | 2 | 200 | 33 | 1,560 |
| Bear, brown, skulls | | | 4 | 20 | 1 | 15 | 5 | 35 |
| Bear, glacier | 3 | 105 | 1 | 20 | | | 4 | 125 |
| Bear, grizzly | 3 | 30 | | | 3 | 115 | 6 | 145 |
| Bear, polar | 3 | 150 | | | 53 | 2,648 | 56 | 2,798 |
| Bear castors | | | | | | 65 | | 65 |
| Bear galls | | | 8 | 2 | | | 8 | 2 |
| Beaver | 368 | 1,922 | 608 | 2,763 | 1,026 | 5,883 | 2,002 | 10,568 |
| Beaver castors | | | | 59 | | 160 | | 219 |
| Coyote | | | | | 11 | 6 | 11 | 6 |
| Ermine | 694 | 447 | 1,221 | 997 | 1,682 | 1,477 | 3,597 | 2,921 |
| Fox, black | 1 | 450 | | | 1 | 250 | 2 | 700 |
| Fox, blue | 2 | 60 | 492 | 14,730 | 660 | 5,636 | 1,154 | 20,426 |
| Fox, blue, live | | | 5 | 175 | | | 5 | 175 |
| Fox, cross | 2 | 20 | 156 | 1,007 | 199 | 1,822 | 357 | 2,849 |
| Fox, grey | | | 1 | 100 | | | 1 | 100 |
| Fox, red | 38 | 370 | 3,714 | 30,084 | 5,618 | 38,688 | 9,370 | 69,142 |
| Fox, silver | | | 50 | 8,650 | 3 | 390 | 53 | 9,040 |
| Fox, silver grey | | | 56 | 3,680 | 57 | 4,019 | 113 | 7,699 |
| Fox, white | | | 13 | 120 | 1,989 | 20,443 | 2,002 | 20,563 |
| Hares, arctic | 4 | 4 | | | | | 4 | 4 |
| Lynx | 182 | 3,541 | 85 | 1,856 | 782 | 18,685 | 1,049 | 24,082 |
| Marten | 403 | 4,294 | 462 | 3,738 | 4,702 | 41,319 | 5,567 | 49,351 |
| Mink | 4,230 | 22,081 | 2,534 | 10,138 | 16,974 | 76,369 | 23,738 | 108,588 |
| Muskrat | 12,738 | 5,086 | 4,479 | 917 | 206,676 | 69,245 | 223,893 | 75,248 |
| Otter, land | 493 | 5,213 | 447 | 4,493 | 921 | 8,843 | 1,861 | 18,549 |
| Otter, sea | 3 | 600 | 24 | 5,900 | 4 | 720 | 31 | 7,170 |
| Otter pups, sea | | | 1 | 5 | 2 | 32 | 3 | 37 |
| Rabbit | | | | | 4 | 4 | 4 | 4 |
| Seal, fur | 138 | 4,207 | | | [b] 14,246 | 468,042 | 14,384 | 472,249 |
| Seal, unborn pup fur | | | | | [c] 121 | 12 | 121 | 12 |
| Squirrel | 20 | 5 | 180 | 39 | 9 | 2 | 209 | 46 |
| Weasel | 36 | 24 | 62 | 31 | 11 | 15 | 109 | 70 |
| Wolf | 57 | 281 | 5 | 40 | 16 | 86 | 78 | 407 |
| Wolverine | 28 | 175 | 75 | 397 | 7 | 42 | 110 | 614 |
| Total | | 54,095 | | 94,506 | | 769,024 | | 917,625 |

[a] This table does not take into account the shipments of furs by mail nor of those carried out among the personal effects of passengers.

[b] Of these 660 skins were from seized Japanese schooners and were sold by the United States marshal for $23,100.

[c] These were also from the above seized Japanese schooners and were sold by the United States marshal.

## AQUATIC FURS.

### BEAVER.

This is the most valuable fur-bearing aquatic animal found in the interior waters of Alaska, and has been hunted with such vigor that its ultimate extinction seems to be now but a question of a few years. The range of this animal covers all of the mainland of Alaska, except-

ing only the belt of barren-coast country bordering the Arctic Ocean from Point Hope north and east to the Canadian line. It is also found on a few of the islands in southeast Alaska, and generally in the lakes and streams of the interior, avoiding the large rivers, owing to the great change in level likely to occur at different seasons. During the last three years a considerable proportion of the supply has come from the Kuskokwim and Yukon Valleys. The natives catch beavers in steel traps set at a frequented spot or shoot them from a concealed place near the beaver house or dam.

Castoreum, an oily odorous compound secreted by the preputial glands of the animal, also the dried preputial follicles and their contents, are sometimes prepared and find a sale in China, where they occupy a place in the pharmacopœia.

In 1905, 1,935 skins; in 1906, 1,536; 1907, 1,159; 1908, 1,280; 1909, 2,323, and in 1910, 2,002 skins were secured.

### MUSKRAT.

This animal is found on the mainland, except along the extreme northern coast line, wherever bogs and ponds or running water occur; it is also found upon Nunivak and St. Michaels Islands. The Kuskokwim and Yukon Valleys, especially the former, furnish the vast majority of the output. The natives also use a large number each year for clothing and in barter with other native tribes. The value of muskrat has been steadily increasing during the last three years and as a result the animal has been hunted more vigorously each season. In 1905, 12,599 skins, valued at $1,192; in 1906, 3,611 skins, valued at $302; in 1907, 6,481 skins, valued at $498; in 1908, 31,712 skins, valued at $6,257; in 1909, 121,568 skins, valued at $34,074, while in 1910, 223,893 skins, valued at $75,248, were secured and shipped from the district. This takes no account of the local trade in skins between the different tribes.

### LAND OTTER.

This species is widely distributed in Alaska, being found on nearly every part of the mainland. It also occurs on many of the islands. A steel trap is generally used in capturing the animals. The supply of land otter skins is fairly constant from year to year.

### SEA OTTER.

But two vessels, the schooner *Everett Hays*, owned by Mr. Samuel Applegate, of Unalaska, and the schooner *Elvira* (formerly the Japanese sealing schooner *Kinsei Maru*), owned by Mr. Fred Schroeder of Dutch Harbor, fitted out for sea-otter hunting in 1910. The hunting is generally carried on between Chirikof and Tugidak Islands (the

latter one of the Trinity Islands) in central Alaska, and the season is from about May 15 to September 1, depending largely upon the state of the weather. This year the weather was very rough and as a result there were only about four days of actual hunting throughout the whole season. The *Everett Hays* secured 4 skins, while the *Elvira* took 12, a total of 16.

A few natives living at Kayak this year hunted for sea otter off Cape St. Elias and on June 7 shot two and on June 15 one. These skins were sold at the near-by town of Katalla.

Mr. Nils Christensen, of Cold Bay, on the Alaska Peninsula, hunts sea otters in winter along the reefs offshore, but secured nothing last winter. The same was true of Mr. Charles Rosenberg, who patrols a stretch of some 30 miles of beach on the Bering Sea side of Unimak Island on the lookout for dead sea otter which may be washed ashore.

This summer a native killed a sea otter near the Naknek River in Bristol Bay, where they are very rarely to be found. One was also killed in the neighborhood of Unga Island in central Alaska.

The Canadian sealing fleet again devoted a considerable part of its energies to the hunting of sea otter off Chirikof Island. The schooner *Thos. F. Bayard* secured two, while the *Pescawha* secured seven.

Several vessels from the Japanese sealing fleet also engaged in sea otter hunting, but with what success we are unable to state, owing to their secretiveness in such matters.

### FUR SEAL.

The only place on the coast of Alaska which maintains a fur-seal fishery is Sitka. In April and May the herd passes Baranof Island, on which Sitka is located, on its way to the Pribilof Islands in Bering Sea, to breed. About the middle of April the native hunters, who are the only persons permitted to engage in the work, with their families, leave for the hunting grounds and establish their camps on Tava, Wrangell, and Biorka Islands, small islands a few miles from Sitka.

This year 10 boat parties had their headquarters on Biorka Island, four on Wrangell Island, and 18 on Tava Island. Each boat party is composed of from 3 to 5 men, and these use sailboats costing about $130 each. Repeating shotguns, costing from $25 to $35 each, are the only weapons used. The hunting is done in the open ocean, and the boats from the various camps cover an area of from 35 to 50 miles directly out from shore and about the same distance up and down the coast. Good weather is essential, and in 1910 the natives were unfortunate, bad weather being frequent, with the result that the catch was very small.

This year 135 skins were taken and sold at a price aggregating $4,117 (price paid the hunters and not the London price). In numbers this is a big decrease from last year, when the natives secured 396 skins. Prices received for the skins averaged much higher than in 1909, when $18.60 was received per skin, as compared with $30.50 this year.

The Biorka Island parties secured 50 skins, the Wrangell Island parties 13, and the Tava Island parties 72. The largest number secured by any one boat was 8.

In outfitting these boats the hunter, who is head man, furnishes the boat and gun, while the rowers furnish the ammunition and food. The gross proceeds arising from the sale of the skins taken are divided equally among the crew, with the exception of the hunter, who gets $3 or $4 more than the others.

The hunting parties return to Sitka the latter part of May. A committee of two is then appointed to supervise the sale of the skins, which usually takes place on a date between June 1 and 5, when the buyers from the States have reached Sitka. On sale day the skins are all brought to one house, where they are sorted into three sizes—"small," "medium," and "large"—care being taken to keep each boat's catch separate from the others. The "small" skins are those of the pups born during the previous two years. The "medium" skins are said to have the best fur, but the buyers prefer the "large" ones on account of their size. The buyers are not allowed to pick out the choice skins and bid on these alone, but must take them as they run, the subdivision in the beginning being made merely in order that the buyers may see what they are bidding on.

These skins are usually much sought after by the dealers, because, being taken by the natives, and a certificate from the collector of customs to this effect being attached to the catch, they can, under the law, be sent abroad to be cleaned and dyed and brought back to be sold in our markets. The possession of such a certificate is considered to add about $10 to the value of the skin.

The Japanese schooners were again troublesome. During bad weather, when the natives could not go out with their small boats, the schooners came in close, and then when the good weather came they would work out just ahead of the native boats and pick up most of the seals.

The Japanese sealing schooner *Kaise Maru*, which was seized on May 3, 1909, by the deputy marshal at Sitka, is still at that place. The crew were charged with killing seals within the 3-mile limit, and also landing on certain islands near by. They were tried at Juneau in September of the same year and acquitted, but the owners failed to resume possession of their vessel after their release.

In 1909 revenue cutters seized the Japanese sealing schooners *Saikai Maru* and *Kinsei Maru*, and charged them with sealing within the 3-mile limit of the Pribilof Islands. The captured vessels were taken to Unalaska and later the officers and men were carried to Valdez, where all were tried and convicted at the November term of court. Condemnation proceedings against the vessels were instituted, and on April 18 of this year the deputy marshal at Unalaska sold the vessels with their stores and equipment, the *Kinsei Maru* bringing $4,600 and the *Saikai Maru* $321.50. When seized the schooners had 660 seal skins, and these sold for $21,780. The vessels were purchased by Mr. Fred Shroeder, of Dutch Harbor, who renamed the *Kinsei Maru* the *Elvira*, and outfitted and sent her out this year on a sea-otter cruise. The skins sold have been included in the statistical tables of this report.

This year the Treasury Department adopted the policy of permitting sealing vessels to take on merely enough water to carry them to the nearest United States port, or if homeward bound, to take them home. Heretofore the vessels have taken aboard water whenever and wherever they pleased, thus being enabled to extend their cruise indefinitely. Several sealing vessels which visited ports in southeast and central Alaska were affected by this rule. Under the law no resident of the United States is permitted to furnish supplies to a sealer at any time.

The lease of the North American Commercial Co. of the Pribilof Islands expired this year, and the Government, through this Department, took possession of the islands. From St. Paul Island 10,754 skins were shipped, while St. George shipped 2,834, a total of 13,586.

## MISCELLANEOUS AQUATIC MAMMALS.

### HAIR SEALS.

These animals are to be found all along the coast of Alaska, occurring in places in almost countless numbers. While they form a very insignificant part of the commerce in which the white traders participate, owing to the fact that their fur is worthless, they are of immense value to the natives, for from the flesh and oil is secured a considerable part of the winter food, while the skins are highly prized for covering the kayaks and umiaks, and for boot soles, trousers, mittens, clothing bags, and caps, and when cut into strips make a very strong and durable cord. The coast natives also barter the flesh, oil, and skins with the interior tribes for reindeer hides and furs, thus creating a very important branch of trade of which it is impossible to form an accurate idea, owing to the inaccessibility of most of the tribes and the secrecy they observe when discussing such matters with white men.

## WALRUSES.

This animal, which is not found south of the Bering Sea shore of the Aleutian chain, was at one time very numerous north of there, and the hunting of it and the seal formed the principal occupation of the Eskimos during the summer. It goes north as the ice breaks up in the spring and returns again in the fall, stopping but a short time at any spot and keeping close to the ice pack all this time.

While the hunting was carried on solely by the natives the herd suffered no appreciable diminution, but in 1868 the whalers began to turn their attention to walrus catching with serious results to the natives, as set forth in a former report.[a]

> To many of the Eskimos, especially on the Arctic shore, the walrus is almost a necessity of life, and the devastation wrought amongst the herds by the whalers has been, and is yet, the cause of fearful suffering and death to many of the natives. The flesh is food for man and dogs; the oil is used for food and for lighting and heating the houses; the skin, when tanned and oiled, makes a durable cover for the large skin boats; the intestines make waterproof clothing, window covers, and floats; the tusks are used for lance or spear points or are carved into a great variety of useful and ornamental objects, and the bones are used to make heads for spears and for other purposes.
>
> During the first part of every season there is but little opportunity to capture whales, they being within the limits of the icy barrier. As a result much of the whalers' time during July and August was devoted to capturing walruses. Men would be landed on the shore in June and left to watch for the animals to haul up on the beach at certain points. The walrus must either come ashore or get on the ice, and when a herd is well ashore one or two old bulls are generally left on watch. The best shot among the hunters now creeps up, and by a successful rifle shot or two kills the guard. Owing to their very defective hearing the noise made by the rifle does not awaken them. The gun is then put aside and each hunter, armed with a sharp ax, approaches the sleeping animals and cuts the spines of as many of them as possible before the others become alarmed and stampede for the water and escape.

The natives hunt the walrus in kayaks, with ivory-pointed spears and sealskin line and floats. When the animal is exhausted by its efforts to escape, the hunters draw near and give the death stroke with a lance.

In 1908 Congress passed an act for the protection of game in Alaska, and in this the killing of walrus north of latitude 62° was permitted only from August 1 to December 10, both inclusive, while no one person was permitted to kill more than one.

This year new regulations were promulgated by the Department of Agriculture, and in these the open season for walruses in Bering Sea and Strait north of the Kuskokwim River is from May 1 to July 1, while all killing in Bristol Bay and Bering Sea south of the Kuskokwim River is prohibited until 1912.

As the natives are permitted to kill the walrus for food and clothing at any time when in need of food, the object of the law, which is

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[a] The Commercial Fisheries of Alaska in 1905. By John N. Cobb, Bureau of Fisheries Document 603, p. 35, 1906.

to prevent the indiscriminate killing by whites, is accomplished, and very few of the animals are now killed except by the few sportsmen who visit the Bering Sea district in summer. This year's reports indicate that walruses are increasing. The inspector of fisheries for Alaska saw a large number on the ice in Bristol Bay in May, while the master of the trading schooner *Helen Johnston* claims to have encountered in Bering Strait, near the Diomede Islands, on July 5 a large herd of swimming walruses which covered several acres of water. Capt. S. F. Cottle, of the steam whaler *Karluk*, reports having seen large pods of walruses this year.

## LICENSE TAXES AND HATCHERY REBATES.

Under the provisions of the act for the protection and regulation of the fisheries of Alaska (approved June 26, 1906) the packers in Alaska are compelled to pay license fees or taxes on their season's output, as noted in the table following. The collection of these license fees or taxes is in the hands of the clerk of the court of the judicial district in which the packer is operating. The law literally requires the packer to pay the license fee in advance, but as the fee is based upon the pack he makes and it would be impossible in such an uncertain industry as fishing to estimate in advance exactly the quantity that will be packed, it is the custom to require the operator to apply for a license before beginning operations and then at the end of the season make return of the amount due the district.

The following table shows the quantity of taxable fishery products prepared, the stated license tax on the product, and the total amount of tax due on each. The last item is approximate, being based upon returns on file at this Bureau, some of which are sworn to and some estimated, and therefore perhaps varying somewhat from those sent to the clerk of the court. It is not probable, however, that the amount given will vary much either way from the correct amount as shown by the returns of the clerks:

LICENSE TAXES ON PREPARED FISHERY PRODUCTS.

| Items. | Unit of quantity. | Quantity prepared. | License tax per unit of quantity. | Estimated amount of tax due. |
|---|---|---|---|---|
| Canned salmon | Cases | 2,413,052½ | $0.04 | $100,522 08 |
| Pickled salmon | Barrels | 14,405 | .10 | 1,440.50 |
| Mild-cured salmon | Tierces [a] | 3,357 | .40 | 1,342.80 |
| Dry-salted salmon in bulk | 100 pounds | 77,478 | .05 | 37.70 |
| Fish oil | Barrels | 578 | .10 | 57.80 |
| Fertilizer, from fish | Tons | 1,308½ | .20 | 261.70 |
| Fertilizer, from whales | do | 435 | .20 | 87.00 |
| Total | | | | 103,749.58 |

[a] As the net weight of a tierce of fish is 800 pounds, this item is figured on a basis of 4 barrels to the tierce in working out the amount of tax.

The following table shows the name of the owner, location of each private salmon hatchery operated during the year ending June 30, 1910, the number of salmon (red) liberated, and the amount of rebate certificates due each hatchery:

REBATES CREDITED TO PRIVATE SALMON HATCHERIES IN 1910.[a]

| Owners. | Location. | Red salmon fry liberated. | Rebate due. |
|---|---|---|---|
| Alaska Packers Association | Naha Stream | 40,725,000 | $16,290 |
| | Karluk Stream | 35,875,000 | 14,350 |
| Northwestern Fisheries Co. | Quadra Lake | 9,850,000 | 3,940 |
| | Hetta Lake | 8,000,000 | 3,200 |
| North Pacific Trading & Packing Co | Klawak Lake | 5,300,000 | 2,120 |
| Total | | 99,750,000 | 39,900 |

[a] Some of the hatcheries did not complete their distribution of fry before July 1; those remaining will be counted next year.

## COMPLAINTS AND PROSECUTIONS.

On Sunday, May 22, in Taku Inlet, southeast Alaska, the assistant agent discovered Henry Hoeke, S. Nelson, John Hanula, Tom Carvo, Abraham Lahti, Oscar Lustig, Van Oleson, and Ole Oleson fishing during the weekly closed season. All were brought before the United States commissioner at Juneau for preliminary hearing and bound over to the next grand jury. On October 24 all were indicted by the grand jury held at Ketchikan, and on the 29th of the same month all but Van and Ole Oleson pleaded guilty. S. Nelson and Henry Hoeke were fined $50 each, while the others were fined $25 each. The Oleson brothers elected to be tried in Juneau, and on December 10 they appeared in court there and pleaded guilty; sentence was deferred for six months.

In October a man named Mitchell was reported by other fishermen as violating the weekly closed season in the Taku River. He was indicted by the December grand jury, but was acquitted upon his trial the same month.

A visit to Tamgas Stream, a tributary of Tamgas Harbor, on the south end of Annette Island, in southeast Alaska, on July 25, developed the fact that a trap was being fished in the creek in violation of the law. Tamgas Stream is a short and narrow stream draining a lake, and a run of red and other salmon annually ascends the stream. About 300 yards from its mouth are a succession of cascades and falls. In the narrowest part of the cascades a rack had been constructed of poles driven into the bottom and covered with wire netting in such way as almost wholly to prevent salmon from passing up, the portion uncovered being too steep for any but the strongest to surmount. Just below and running parallel to the rack, and at right angles to the shore, was constructed a flume, with a flaring

mouth at the outer end; at the shore end a sharp turn of the flume led into a square box with slat bottom and covered over with boughs. The fish in ascending the stream would be stopped by the rack and in swimming around at the outer end many of them would be carried by the current into and down the flume, eventually landing in the receiving box at the end.

Inquiry among the few Indians camped near the mouth of the stream developed the fact that a native named James, of Metlakahtla, who died last winter, had first constructed the trap several years ago. This spring his two sons, boys under 18 years of age, rebuilt the trap. They were ordered to remove it and did so at once. Owing to the youth of the offenders and other extenuating circumstances, the matter was not presented to the United States attorney for action.

On July 6 Mr. Nels Moen, of Wrangell, complained in regard to the location of the Alaska Packers Association trap in Humpback Bay, Bradfield Canal, and also said his partner in the operation of a rival trap in the same bay, Mr. Oscar Williamson, could prove that the association's trap had been fishing on Sunday, July 3. As soon as possible thereafter a visit was made to Humpback Bay, where an inspection of the trap showed that it was constructed and placed in conformity with the law. As Mr. Williamson was confident of having evidence enough to justify his charge that the trap had been operated during the weekly closed season, the matter was brought before the United States commissioner at Wrangell, Mr. Williamson making the sworn complaint. Mr. H. A. Oleson, the trap foreman, was arrested and brought to Wrangell for preliminary hearing. The evidence, however, clearly showed no intent at violating the law and the defendant was discharged.

On the occasion of a visit to Sarkar Stream, on the west coast of Prince of Wales Island, southeast Alaska, on August 26, Mr. Fred Brockman was discovered fishing a gill net which had been stretched from bank to bank. The net had 13 coho salmon in it at the time. Brockman was arraigned before the United States commissioner at Wrangell on September 3 and by him was bound over to the next grand jury, which began its sessions at Ketchikan on October 24 and indicted the defendant on the same date. On October 24 he appeared in court and pleaded guilty. Owing to the defendant's physical condition the court imposed the small fine of $25, but gave an impressive warning that the next offender appearing in court charged with this serious offense would be severely dealt with.

In the latter part of July several natives reported to the deputy marshal at Sitka that native fishermen were fishing within the prohibited area around the mouth of Necker Stream, which empties into Necker Bay, on the west coast of Baranof Island, in southeast Alaska. Twenty-five natives were brought in by the deputy marshal and

given a hearing before the United States commissioner at Sitka, who discharged all of the defendants, however, for lack of evidence.

Several complaints were made in regard to alleged illegal fishing by gill netters operating in Karta Bay, Prince of Wales Island, southeast Alaska, but diligent search failed to substantiate any of these, and as the nets were soon withdrawn the complaints, which had come from purse seiners, ceased.

On June 25 the deputy marshal and deputy collector of customs at Cordova visited Eyak River and found Perry and Causa Sabella, fishermen employed by the Northwestern Fisheries Co. at Orca, with a gill net stretched from shore to shore. The net held at the time of the visit some 40 or 50 fish. The men were brought before the United States commissioner at Cordova and fined $1 and costs, amounting in all to $50 each.

An evil which at present is slight, but will grow more and more serious as the district becomes more settled and the superabundant water power, which at present largely goes to waste, is harnessed and made to serve the purposes of the manufacturer, prospector, lumberman, etc., is the building of dams in streams which the salmon frequent. By the terms of the law it is—

> unlawful to erect or maintain any dam, barricade, fence, trap, fish wheel, or other fixed or stationary obstruction, except for purposes of fish culture, in any of the waters of Alaska at any point where the distance from shore to shore is less than five hundred feet, * * * with the purpose or result of capturing salmon or preventing or impeding their ascent to their spawning grounds, and the Secretary of Commerce and Labor is hereby authorized and directed to have any and all such unlawful obstructions removed or destroyed.

In the past, builders of such obstructions have been very negligent in consulting the salmon agents in regard to the legality of their structures, and as a result considerable expense has been caused to them by their failure to observe the plain provisions of the law. Where some municipal or commercial benefit is to result the agents have been willing to meet the parties more than half way and to supply all needful plans for the placing of fishways in such dams where feasible.

## PROPOSED LEGISLATION.

At the hearings held between April 19 and May 25, before the Committee on the Territories of the House of Representatives, on H. R. 22579, Sixty-first Congress, second session, known as the Wickersham bill, in amendment of the Alaska fisheries law of June 26, 1906, representatives of the Bureau furnished statements and testimony bearing on the provisions of this bill in their relation to the fisheries. At the close of these hearings the following letter was transmitted by the Secretary of Commerce and Labor in response to a request for the opinion of the Department with respect to changes or additions

desirable in the law. The proposals for legislation increase the taxes somewhat, and aim to extend and increase the power of the Department over all Alaskan fisheries save the fur seal.

DEPARTMENT OF COMMERCE AND LABOR,
OFFICE OF THE SECRETARY,
*Washington, May 25, 1910.*

Hon. E. L. HAMILTON,
*Chairman Committee on the Territories,*
*House of Representatives, Washington, D. C.*

SIR: In reply to your letter of the 20th instant, in which you request the opinion of the Department with respect to changes advisable in the present Alaska fisheries law, after consideration of the act of June 26, 1906, section by section, the following recommendations are submitted:

1. Sections 5, 7, 8, 10, 11, 12, 13, 14, 15, and 16 are satisfactory.

2. Section 1 should be modified in accordance with the schedule already submitted at the hearing of May 3. This schedule is along the lines indicated by Judge Wickersham in H. R. 22579.

3. Section 2 should remain until more adequate facilities are provided for fish-cultural work by the Federal Government. All fish-cultural work in Alaska should eventually be carried on by the Federal Government. This can be brought about by the abolition of the present exemption system, the taking over of such private hatcheries as the owners may desire to turn over to the Government, and the establishment of additional Federal hatcheries.

4. In section 3, line 2, strike out the words "for purposes of fish-culture" and insert in lieu thereof "by direction of the Secretary of Commerce and Labor"; and in lines 4 and 5 strike out the words "where the same is less than five hundred feet in width."

5. In section 4, line 2, strike out the words "for purposes of fish culture" and insert in lieu thereof "by direction of the Secretary of Commerce and Labor."

6. In section 6, lines 6 and 7, strike out the words "five hundred yards of the mouth thereof" and insert in lieu thereof "such distance from the mouth thereof as in his judgment is necessary."

7. The matter covered by section 9 is now fully covered by the pure food and drugs act, food inspection decision No. 105, and this section may therefore be omitted.

8. The following additional sections are now recommended:

"SECTION —. That for the purposes of this act the Secretary of Commerce and Labor is authorized to determine and indicate by suitable markers the mouth of any creek, stream, or river in Alaska which salmon enter for spawning purposes.

"SEC. —. That the Secretary of Commerce and Labor is authorized and directed to establish such regulations, not inconsistent with existing law, as may in his judgment be necessary for the proper protection and conservation of shellfish and other aquatic animals not otherwise mentioned in this act.

"SEC. —. That it shall be unlawful to erect, maintain, or operate in Alaska any new establishment for canning or otherwise preserving for commercial use any salmon or other fish or fishery product, or to increase the capacity of any such existing establishment, or to reopen and operate any such establishment which has remained closed for the period of three years immediately preceding the passage of this act, without first obtaining the approval in writing of the Secretary of Commerce and Labor.

"*Provided, however*, That in the case of salmon-packing establishments approval shall be withheld only when in his judgment the fishing operations and investigations in the region adjacent to the proposed location indicate that the number of salmon taken is larger than the reproductive increase of salmon from adjacent spawning grounds: *And provided further*, That in case approval is withheld the applicant interested shall upon demand be given a hearing, of which he shall be notified at least thirty days previously.

"SEC. —. That it shall be unlawful, after January first, nineteen hundred and eleven, to utilize any part of any food fish save the offal and refuse thereof in the manufacture of fertilizer or fish oil.

"SEC. —. That the provisions of sections thirteen and sixteen of chapter four hundred and twenty-five of an act entitled 'An act making appropriations for the construction, repair, and preservation of certain public works on rivers and harbors, and for other purposes,' approved March third, eighteen hundred and ninety-nine, shall be applied to the protection of the fisheries of Alaska, and the Secretary of Commerce and Labor and his agents for the protection of the salmon fisheries of Alaska, and any officer or employee of the Department of Commerce and Labor designated by him, shall be charged with the enforcement of said section thirteen and shall have the same power and authority in all respects to swear out process and arrest as the several officials named in section seventeen of chapter four hundred and twenty-five of the above act."

Respectfully,

CHARLES NAGEL, *Secretary.*

There is pending before Congress a measure for reorganization and expansion of the Alaska work of the Bureau of Fisheries, under the one head of Alaska Fisheries Service. This division will include, if the law is enacted, the salmon-inspection service and the fur-seal service, together with supervision of all other fisheries and fur resources of Alaska.

## RECOMMENDATIONS.

1. That vessels be provided for the inspection service as recommended in the report for 1909, and that immediate provision be made for the two smaller launches requested, as the most urgent needs of the service, for use during the 1911 season.

2. That in addition to the recommendations contained in departmental letter of May 25, 1910, printed on page 64 of this report, for the amendment of the present fisheries act of June 26, 1906, the weekly close season for salmon, as expressed in section 5 of the existing law, be extended over all Alaskan waters except Bering Sea and its arms; and that in sections 3 and 4 the word "salmon" be substituted for red salmon.

# APPENDIX—FISHERY LAWS AND REGULATIONS.

The following laws relating to the fisheries and fur-bearing animals of Alaska, and the regulations established thereunder, which are now in force in the District, are published herewith for the guidance of those interested:

AN ACT for the protection and regulation of the fisheries of Alaska.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That every person, company, or corporation carrying on the business of canning, curing, or preserving fish or manufacturing fish products within the territory known as Alaska, ceded to the United States by Russia by the treaty of March thirtieth, eighteen hundred and sixty-seven, or in any of the waters of Alaska over which the United States has jurisdiction, shall, in lieu of all other license fees and taxes therefor and thereon, pay license taxes on their said business and output as follows: Canned salmon, four cents per case; pickled salmon, ten cents per barrel; salt salmon in bulk, five cents per one hundred pounds; fish oil, ten cents per barrel; fertilizer, twenty cents per ton. The payment and collection of such license taxes shall be under and in accordance with the provisions of the Act of March third, eighteen hundred and ninety-nine, entitled "An Act to define and punish crimes in the district of Alaska, and to provide a code of criminal procedure for the district," and amendments thereto.

SEC. 2. That the catch and pack of salmon made in Alaska by the owners of private salmon hatcheries operated in Alaska shall be exempt from all license fees and taxation of every nature at the rate of ten cases of canned salmon to every one thousand red or king salmon fry liberated, upon the following conditions:

That the Secretary of Commerce and Labor may from time to time, and on the application of the hatchery owner shall, within a reasonable time thereafter, cause such private hatcheries to be inspected for the purpose of determining the character of their operations, efficiency, and productiveness, and if he approve the same shall cause notice of such approval to be filed in the office of the clerk or deputy clerk of the United States district court of the division of the district of Alaska wherein any such hatchery is located, and shall also notify the owners of such hatchery of the action taken by him. The owner, agent, officer, or superintendent of any hatchery the effectiveness and productiveness of which has been approved as above provided shall, between the thirtieth day of June and the thirty-first day of December of each year, make proof of the number of salmon fry liberated during the twelve months immediately preceding the thirtieth day of June, by a written statement under oath. Such proof shall be filed in the office of the clerk or deputy clerk of the United States district court of the division of the district of Alaska wherein such hatchery is located, and when so filed shall entitle the respective hatchery owners to the exemption as herein provided; and a false oath as to the number of salmon fry liberated shall be deemed perjury and subject the offender to all the pains and penalties thereof. Duplicates of such statements shall also be filed with the Secretary of Commerce and Labor. It shall be the duty of such clerk or deputy clerk in whose office the approval and

proof heretofore provided for are filed to forthwith issue to the hatchery owner, causing such proofs to be filed, certificates which shall not be transferable and of such denominations as said owner may request (no certificate to cover fewer than one thousand fry), covering in the aggregate the number of fry so proved to have been liberated; and such certificates may be used at any time by the person, company, corporation, or association to whom issued for the payment pro tanto of any license fees or taxes upon or against or on account of any catch or pack of salmon made by them in Alaska; and it shall be the duty of all public officials charged with the duty of collecting or receiving such license fees or taxes to accept such certificates in lieu of money in payment of all license fees or taxes upon or against the pack of canned salmon at the ratio of one thousand fry for each ten cases of salmon. No hatchery owner shall obtain the rebates from the output of any hatchery to which he might otherwise be entitled under this Act unless the efficiency of said hatchery has first been approved by the Secretary of Commerce and Labor in the manner herein provided for.

SEC. 3. That it shall be unlawful to erect or maintain any dam, barricade, fence, trap, fish wheel, or other fixed or stationary obstruction, except for purposes of fish culture, in any of the waters of Alaska at any point where the distance from shore to shore is less than five hundred feet, or within five hundred yards of the mouth of any red-salmon stream where the same is less than five hundred feet in width, with the purpose or result of capturing salmon or preventing or impeding their ascent to their spawning grounds, and the Secretary of Commerce and Labor is hereby authorized and directed to have any and all such unlawful obstructions removed or destroyed.

SEC. 4. That it shall be unlawful to lay or set any drift net, seine, set net, pound net, trap, or any other fishing appliance for any purpose except for purposes of fish culture, across or above the tide waters of any creek, stream, river, estuary, or lagoon, for a distance greater than one-third the width of such creek, stream, river, estuary, or lagoon, or within one hundred yards outside of the mouth of any red-salmon stream where the same is less than five hundred feet in width. It shall be unlawful to lay or set any seine or net of any kind within one hundred yards of any other seine, net, or other fishing appliance which is being or which has been laid or set in any of the waters of Alaska, or to drive or construct any trap or any other fixed fishing appliance within six hundred yards laterally or within one hundred yards endwise of any other trap or fixed fishing appliance.

SEC. 5. That it shall be unlawful to fish for, take, or kill any salmon of any species in any manner or by any means except by rod, spear, or gaff, in any of the waters of Alaska over which the United States has jurisdiction, except Cook Inlet, the Delta of Copper River, Bering Sea, and the waters tributary thereto, from six o'clock postmeridian of Saturday of each week until six o'clock antemeridian of the Monday following, or to fish for, or catch, or kill in any manner or by any appliances except by rod, spear, or gaff, any salmon in any stream of less than one hundred yards in width in Alaska between the hours of six o'clock in the evening and six o'clock in the morning of the following day of each and every day of the week. Throughout the weekly close season herein prescribed the gate, mouth, or tunnel of all stationary and floating traps shall be closed, and twenty-five feet of the webbing or net of the "heart" of such traps on each side next to the "pot" shall be lifted or lowered in such manner as to permit the free passage of salmon and other fishes.

SEC. 6. That the Secretary of Commerce and Labor may, in his discretion, set aside any streams or lakes as preserves for spawning grounds, in which fishing may be limited or entirely prohibited; and when, in his judgment, the results of fishing operations in any stream, or off the mouth thereof, indicate that the number of salmon taken is larger than the natural production of salmon in such stream, he is authorized to establish close seasons or to limit or prohibit fishing entirely for one year or more within such stream or within five hundred yards of the mouth thereof, so as to permit salmon to increase: *Provided, however,* That such power shall be exercised only after

all persons interested shall be given a hearing, of which due notice must be given by publication; and where the interested parties are known to the Department they shall be personally notified by a notice mailed not less than thirty days previous to such hearing. No order made under this section shall be effective before the next calendar year after same is made: *And provided further*, That such limitations and prohibitions shall not apply to those engaged in catching salmon who keep such streams fully stocked with salmon by artificial propagation.

SEC. 7. That it shall be unlawful to can or salt for sale for food any salmon more than forty-eight hours after it has been killed.

SEC. 8. That it shall be unlawful for any person, company, or corporation wantonly to waste or destroy salmon or other food fishes taken or caught in any of the waters of Alaska.

SEC. 9. That it shall be unlawful for any person, company, or corporation canning, salting, or curing fish of any species in Alaska to use any label, brand, or trade-mark which shall tend to misrepresent the contents of any package of fish offered for sale, *Provided*, That the use of the terms "red," "medium red," "pink," "chum," and so forth, as applied to the various species of Pacific salmon under present trade usages shall not be deemed in conflict with the provisions of this Act when used to designate salmon of those known species.

SEC. 10. That every person, company, and corporation engaged in catching, curing, or in any manner utilizing fishery products, or in operating fish hatcheries in Alaska, shall make detailed annual reports thereof to the Secretary of Commerce and Labor, on blanks furnished by him, covering all such facts as may be required with respect thereto for the information of the Department. Such reports shall be sworn to by the superintendent, manager, or other person having knowledge of the facts, a separate blank form being used for each establishment in cases where more than one cannery, saltery, or other establishment is conducted by a person, company, or corporation, and the same shall be forwarded to the Department at the close of the fishing season and not later than December fifteenth of each year.

SEC. 11. That the catching or killing, except with rod, spear, or gaff, of any fish of any kind or species whatsoever in any of the waters of Alaska over which the United States has jurisdiction, shall be subject to the provisions of this Act, and the Secretary of Commerce and Labor is hereby authorized to make and establish such rules and regulations not inconsistent with law as may be necessary to carry into effect the provisions of this Act.

SEC. 12. That to enforce the provisions of this Act and such regulations as he may establish in pursuance thereof, the Secretary of Commerce and Labor is authorized and directed to depute, in addition to the agent and assistant agent of salmon fisheries now provided by law, from the officers and employees of the Department of Commerce and Labor, a force adequate to the performance of all work required for the proper investigation, inspection, and regulation of the Alaskan fisheries and hatcheries, and he shall annually submit to Congress estimates to cover the cost of the establishment and maintenance of fish hatcheries in Alaska, the salaries and actual traveling expenses of such officials, and for such other expenditures as may be necessary to carry out the provisions of this Act.

SEC. 13. That any person, company, corporation, or association violating any provision of this Act or any regulation established in pursuance thereof shall, upon conviction thereof, be punished by a fine not exceeding one thousand dollars or imprisonment at hard labor for a term of not more than ninety days, or by both such fine and imprisonment, at the discretion of the court; and in case of the violation of any of the provisions of section four of this Act and conviction thereof a further fine of not more than two hundred and fifty dollars per diem may, at the discretion of the court, be imposed for each day such obstruction is maintained. And every vessel or other apparatus or equipment used or employed in violation of any provision of this Act, or

of any regulation made thereunder, may be seized by order of the Secretary of Commerce and Labor, and shall be held subject to the payment of such fine or fines as may be imposed.

SEC. 14. That the violation of any provision of this Act may be prosecuted in any district court of Alaska or any district court of the United States in the States of California, Oregon, or Washington. And it shall be the duty of the Secretary of Commerce and Labor to enforce the provisions of this Act and the rules and regulations made thereunder. And it shall be the duty of the district attorney to whom any violation is reported by any agent or representative of the Department of Commerce and Labor to institute proceedings necessary to carry out the provisions of this Act.

SEC. 15. That all Acts or parts of Acts inconsistent with the provisions of this Act are, so far as inconsistent, hereby repealed.

SEC. 16. That this Act shall take effect and be in force from and after its passage.

Approved, June 26, 1906.

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AN ACT To prohibit aliens from fishing in the waters of Alaska.

*Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled*, That it shall be unlawful for any person not a citizen of the United States, or who has declared his intention to become a citizen of the United States, and is not a bona fide resident therein, or for any company, corporation, or association not organized or authorized to transact business under the laws of the United States or under the laws of any State, Territory, or district thereof, or for any person not a native of Alaska, to catch or kill, or attempt to catch or kill, except with rod, spear, or gaff, any fish of any kind or species whatsoever in any of the waters of Alaska under the jurisdiction of the United States: *Provided, however*, That nothing contained in this Act shall prevent those lawfully taking fish in the said waters from selling the same, fresh or cured, in Alaska or in Alaskan waters, to any alien person, company, or vessel then being lawfully in said waters: *And provided further*, That nothing contained in this Act shall prevent any person, firm, corporation, or association lawfully entitled to fish in the waters of Alaska from employing as laborers any aliens who can now be lawfully employed under the existing laws of the United States, either at stated wages or by piecework, or both, in connection with Alaskan fisheries, or with the canning, salting or otherwise preserving of fish.

SEC. 2. That every person, company, corporation, or association found guilty of a violation of any provision of this Act or of any regulation made thereunder shall, for each offense, be fined not less than one hundred dollars nor more than five hundred dollars, which fine shall be a lien against any vessel or other property of the offending party or which was used in the commission of such unlawful act. Every vessel used or employed in violation of any provision of this Act or of any regulation made thereunder shall be liable to a fine of not less than one hundred dollars nor more than five hundred dollars, and may be seized and proceeded against by way of libel in any court having jurisdiction of the offense.

SEC. 3. That the violation of any provision of this Act or of any regulation made thereunder may be prosecuted in any United States district court of Alaska, California, Oregon, or Washington.

SEC. 4. That the collector of customs of the district of Alaska is hereby authorized to search and seize every foreign vessel and arrest every person violating any provision of this Act or any regulation made thereunder, and the Secretary of Commerce and Labor shall have power to authorize officers of the Navy and of the Revenue-Cutter Service and agents of the Department of Commerce and Labor to likewise make such searches, seizures, and arrests. If any foreign vessel shall be found within the waters to which this Act applies, having on board fresh or cured fish and apparatus or imple-

ments suitable for killing or taking fish, it shall be presumed that the vessel and apparatus were used in violation of this Act until it is otherwise sufficiently proved. And every vessel, its tackle, apparatus, or implements so seized shall be given into the custody of the United States marshal of either of the districts mentioned in section three of this Act, and shall be held by him subject to the proceedings provided for in section two of this Act. The facts in connection with such seizure shall be at once reported to the United States district attorney for the district to which the vessel so seized shall be taken, whose duty it shall be to institute the proper proceedings.

SEC. 5. That the Secretary of Commerce and Labor shall have power to make rules and regulations not inconsistent with law to carry into effect the provisions of this Act. And it shall be the duty of the Secretary of Commerce and Labor to enforce the provisions of this Act and the rules and regulations made thereunder, and for that purpose he may employ, through the Secretary of the Treasury and the Secretary of the Navy, the vessels of the United States Revenue-Cutter Service and of the Navy: *Provided, however,* That nothing contained in this Act shall be construed as affecting any existing treaty or convention between the United States and any foreign power.

Approved, June 14, 1906.

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### FISHERY REGULATIONS.

1. During the inspection of the salmon fisheries by the agents and representatives of this Department, they shall have at all times free and unobstructed access to all canneries, salteries, and other fishing establishments, and to all hatcheries.

2. All persons, companies, or corporations owning, operating, or using any trap-net, pound-net, or fish-wheel for taking salmon or other fishes shall cause to be placed in a conspicuous place on said trap-net, pound-net, or fish-wheel the name of the person, company, or corporation owning, operating, or using same, together with a distinctive number, letter, or name which shall identify each particular trap-net, pound-net, or fish-wheel, said lettering and numbering to consist of black figures and letters, not less than six inches in length, painted on white ground.

3. All persons, companies, or corporations engaged in canning salmon shall forward to the Bureau of Fisheries, Department of Commerce and Labor, Washington, D. C., three copies of each and every different can label which it is designed to place upon the canned product.

CHARLES NAGEL, *Secretary.*

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### REGULATIONS FOR THE PROTECTION OF FUR-BEARING ANIMALS IN ALASKA.

[Alaska Fisheries Service—Circular No. 1.a]

MARCH 8, 1911.

*To whom it may concern:*

Section 4 of "An act to protect the seal fisheries of Alaska, and for other purposes," approved April 21, 1910, provides that—

No person shall kill any otter, mink, marten, sable, or fur seal, or other fur-bearing animal, within the limits of Alaska Territory or in the waters thereof; and every person guilty thereof shall, for each offense, be fined not less than two hundred nor more than one thousand dollars or imprisoned not more than six months, or both; and all vessels, their tackle, apparel, furniture, and cargo found engaged in violation of this section shall be forfeited; but the Secretary of Commerce and Labor shall have power to authorize the killing of any such mink, marten, sable, fur seal, or other

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a The sundry civil bill passed by Congress March 4, 1911, provided for a reorganization and expansion of the Alaska service of the Bureau of Fisheries, as referred to on page 65 of this report. This circular, while by its date not strictly within the scope of the report for 1910, is printed here for its usefulness in connection with the other laws now administered by the Alaska fisheries service.

fur-bearing animal under such regulations as he may prescribe; and it shall be the duty of the Secretary of Commerce and Labor to prevent the killing of any fur seal except as authorized by law and to provide for the execution of the provisions of this section until it is otherwise provided by law.

Fur-bearing animals enumerated below may, subject to the provisions of regulation No. 12, be hunted and killed in the Territory of Alaska, except during the seasons specified with respect to each of the several animals mentioned.

1. *Sea otter.*—The hunting or killing of sea otter is prohibited until November 1, 1920.

2. *Beaver.*—The hunting or killing of beaver is prohibited prior to November 1, 1915.

3. *Land otter and mink.*—The hunting or killing of land otter or mink is prohibited throughout the season from April 1 to November 15, both days inclusive, of each year.

4. *Marten, fisher, sable, ermine, and weasel.*—The hunting or killing of marten, fisher, sable, ermine, or weasel is prohibited throughout the season from April 1 to November 15, both days inclusive, of each year.

5. *Muskrat.*—The hunting or killing of muskrat is prohibited throughout the season from May 16 to November 30, both days inclusive, of each year.

6. *Black bear.*—The hunting or killing of black bear is prohibited throughout the season from June 1 to August 31, both days inclusive, of each year.

7. *Fox, lynx, and wildcat.*—The hunting or killing of fox, lynx, or wildcat is prohibited throughout the season from March 1 to November 15, both days inclusive, of each year.

8. *Wolf, wolverine, spermophile, and rabbit or hare.*—The killing of wolves, wolverines, spermophiles (ground squirrels), and rabbits or hares is not prohibited.

9. The killing of any fur-bearing animal by means of strychnine or any other poison is prohibited at all times.

10. Permits or licenses may be issued by the Secretary of Commerce and Labor for the taking of fur-bearing animals for scientific purposes, for shipment to zoological parks, or for breeding purposes.

11. The penalties and forfeitures imposed by the act will be strictly enforced against all persons who take, capture, or kill, or attempt to take, capture, or kill, any fur-bearing animal in the Territory of Alaska during the prohibited seasons herein established, or who barter or have in their possession the skin or pelt of any fur-bearing animal taken in the close or prohibited season.

12. Shipments of furs, which may be made at any time, will be reported to the Bureau of Fisheries, Department of Commerce and Labor, on appropriate blanks which will be supplied for that purpose.

These regulations supersede all others previously in force.

Approved:

CHARLES NAGEL, *Secretary.*

# SPECIAL INVESTIGATION OF THE ALASKA FUR-SEAL ROOKERIES, 1910

By HAROLD HEATH

*Professor of Invertebrate Zoology, Stanford University*

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Bureau of Fisheries Document No. 748

# CONTENTS.


| | Page. |
|---|---|
| Brief sketch of natural history of the seal | 3 |
| The rookeries | 4 |
| Rookery development | 4 |
| Harem counts | 5 |
| Active bulls | 6 |
| Idle bulls | 7 |
| Young bulls | 7 |
| Counts of idle and young bulls | 8 |
| Breeding cows | 8 |
| Counts of pups | 9 |
| Estimates of cows and pups | 10 |
| Yearlings and 2-year-olds | 11 |
| The reserve | 11 |
| Estimate of all classes | 12 |
| The quota | 13 |
| Conservation and some involved problems | 13 |
| The question of an equilibrium of the herd | 15 |
| The patrol and pelagic sealing | 16 |
| The pelagic catch | 18 |
| Cows in drives | 19 |
| Causes of death | 19 |
| Ages of seals | 20 |
| Appendix—Extract from field notes | 21 |

# SPECIAL INVESTIGATION OF THE ALASKA FUR-SEAL ROOKERIES, 1910.

By Harold Heath,
*Professor of Invertebrate Zoology, Stanford University.*

Under the act of Congress of April 21, 1910, involving various changes in the administration of the Pribilof Islands and the seal fisheries and providing for the appointment of additional officers and employees, it was decided that a naturalist should be designated to study and report upon the condition of the seal herd. Pending the selection of a permanent occupant of this position, to take effect July 1 under the law, the writer was sent to the islands as a special investigator to perform the naturalist's duties for the season which was already beginning. Observations were made on St. Paul Island, beginning June 29, the date of arrival on the island, and continuing until July 15, then for a week on St. George Island, and again on St. Paul until August 29. A report of these observations is contained in the following pages.

I am indebted to the Government agents on the islands and to the officers of the revenue fleet for valuable data and many courtesies in connection with my work.

## BRIEF SKETCH OF NATURAL HISTORY OF THE SEAL.

As popularly applied the term "seal" includes a fairly large group of aquatic mammals, such as the sea lion and the fur and hair seals, all of which bear a superficial resemblance to each other. Strictly speaking, the last named are the only ones deserving of the name. Unlike the hair seal, the fur seal, or sea bear, is able to progress readily on land, is able to hold its head erect, and its fore limbs, finlike in form, are used in swimming. Concerning its life at sea, we know that the seals of the Pribilof Islands spend their winter months along the western coast of North America, the adult females extending their migrations as far as southern California. Early in May the adult males or bulls begin to appear on the rookeries, where each is subsequently joined by 30 females on the average, the height of the

breeding season occurring about the 15th of July. Shortly after her arrival each cow gives birth to a pup, and after a sojourn of perhaps two weeks, during which time she is served by the bull, she puts out to sea on the first of several journeys in search of food.

During this time the young males or bachelors are arriving, and are usually found in groups on the outskirts of the rookeries. It is from these young males that the land catch of skins is made.

Early in August disorganization of the harems commences. The greater number of cows have been served, the active bulls accordingly relax their vigilance, the idle bulls and those less mature wander about without serious molestation, the pups congregate at various points on shore or in the shallows, where they learn to swim, and as autumn advances the roving instinct becomes more and more apparent in all classes, finally leading to the abandonment of the shore early in November.

## THE ROOKERIES.

In position and extent the rookeries have undergone but few changes since last year. The number of active bulls and the attendant harems have decreased slightly, but whether this indicates an actual decrease in the number of cows is doubtful, since the count of pups, as noted in a succeeding section, was made on one rookery only and the data derived therefrom are not perfectly trustworthy. The decline in the number of harems on St. Paul is most apparent on Gorbatch, the Zapadnis, and Tolstoi, where there are 55 less than in 1909. On the other hand, there are 47 more on the Reef, Kitovi, Polovina, and Vostochni. On St. George the very slight increase noted on Staraya Artel and Zapadni is almost exactly counterbalanced by a decline on North and East rookeries.

This year the fleet operated chiefly about Northeast Point and to the south and east between St. Paul and St. George, but the results of their operations do not appear to be so distinctly reflected in a corresponding decline of adjacent rookeries as in 1909. Such a definite effect requires that the seals put out to sea along radii centering in either one of the islands, but on numerous occasions I have watched cows, and especially bachelors, leaving the rookeries, and their course is far from being either direct or uniform. The problem, however, is of interest chiefly to the naturalist as matters rest at present, and is without any very practical bearing on the conservation of the herd.

## ROOKERY DEVELOPMENT.

At present there appear to be no very definite problems associated with the development of the rookery, but following the custom observed for several years past counts of harems and cows were made whenever and wherever it was possible. Kitovi especially received

attention and as far as practicable was examined at intervals of about three days with the following results:

DEVELOPMENT OF KITOVI ROOKERY, SEASON OF 1910, AS SHOWN BY COUNTS OF SEALS ON DIFFERENT DATES.

| Date. | Harems. | Cows. | Reserve bulls. | Half bulls. |
|---|---|---|---|---|
| June 30 | 16 | 27 | 37 | 6 |
| July 2 | 32 | 107 | 24 | 14 |
| July 6 | 43 | 326 | 19 | 7 |
| July 9 | 47 | 500 | 14 | 10 |
| July 13 | 62 | 929 | 9 | 10 |

The past winter was unusually severe and long continued, delaying the breaking up of the drift ice, the melting of the snow, and the appearance of flowering plants for upward of three weeks. It is interesting to note, however, that this delay did not affect the summer resident birds, which put in an appearance at the customary time, though compelled in numerous instances to deposit their eggs on the snow. Nor did it hinder the migration of the seals, though several cows likewise took up positions on snow drifts, where they and the pups appeared to be unmindful of their unusual habitat.

## HAREM COUNTS.

In accordance with the custom pursued in past years, the counts of harems were made as nearly as possible at the "height of the season," occurring July 12–16. Owing to stress of weather Sivutch, or Sea Lion Rock, rookery was not counted, but was estimated as containing 61 harems, the number found last season.

SUMMARY OF HAREM COUNTS, 1910, AND COMPARISON WITH 1897 AND 1909.[a]

| Rookery. | 1897 | 1909[a] | 1910 | Rookery. | 1897 | 1909 | 1910 |
|---|---|---|---|---|---|---|---|
| St. Paul Island: | | | | St. George Island: | | | |
| Gorbatch | 308 | 120 | 112 | Little East | 46 | 4 | 4 |
| Ardiguen | 33 | 11 | 11 | East | 128 | 65 | 59 |
| Reef | 454 | 184 | 206 | Zapadni | 133 | 43 | 47 |
| Sea Lion Rock | 102 | 61 | 61[b] | Staraya Artel | 57 | 42 | 48 |
| Kitovi | 179 | 55 | 62 | North | 196 | 106 | 103 |
| Lukanin | 139 | 39 | 41 | | | | |
| Polovina | 143 | 42 | 50 | Total | 560 | 260 | 261 |
| Polovina Cliffs | 61 | 23 | 20 | | | | |
| Little Polovina | 40 | 19 | 12 | Grand total | 4,418 | 1,387 | 1,381 |
| Morjovi | 233 | 45 | 47 | | | | |
| Vostochni | 910 | 184 | 204 | | | | |
| Zapadni | 458 | 147 | 118 | | | | |
| Little Zapadni | 176 | 62 | 54 | | | | |
| Zapadni Reef | 114 | 11 | 7 | | | | |
| Tolstoi | 295 | 87 | 77 | | | | |
| Tolstoi Cliffs | 98 | 25 | 29 | | | | |
| Lagoon | 115 | 12 | 9 | | | | |
| Total | 3,858 | 1,127 | 1,120 | | | | |

[a] Figures for 1909 are those of Mr. George A. Clark. [b] Estimated.

Assuming that Sea Lion Rock is occupied by the same number of harems as in 1909 or neglecting it for both seasons, there are 7 fewer harems on St. Paul this year than last.

Comparing the number of harems on St. George during the years 1909 and 1910 there is 1 more, and when both islands are considered 6 fewer. As there is one bull to a harem, this is another way only of stating that there are 6 fewer bulls this year than last; and obviously such an estimate affords no indication whatever of the actual number of breeding cows.

### ACTIVE BULLS.

The number of active bulls, each in control of a harem, is as just noted, somewhat smaller this year than last (as 1,387 to 1,381); but it is the universal verdict that as a class they have lost none of those characteristics that make them successful masters. As usual there was considerable skirmishing among them as the harems were forming, but the wounds inflicted were comparatively insignificant and no deaths were recorded. Early in the season one dead female was found on Gorbatch whose wounds may have been caused by a bull, and later six cows were seen on various rookeries that had been severely though not fatally slashed.

In a few cases young bulls or "quitters" were found with harems on various rookeries, but usually they held sway on the outskirts of the community and joined the females in the mad rush to the sea whenever they were approached. It was the rare exception that they held a position in the more crowded portions of the rookery, where they would be called upon to defend their cows against the attempted inroads on the part of more seasoned harem masters.

By some authorities it has been urged that this infusion of young male life into the general herd is beneficial, but in all probability its value is overestimated. It is not disclaimed that some animals are born with more vigorous constitutions than others, and that in all probability their offspring will be more hardy in consequence. And furthermore, it is a truism that in the struggle for existence it is a gain that the feeble are weeded out; but this is an entirely different question from the one relating to the effects of age. In the case of the female a long existence may lessen the production of milk or alter its composition, and consequently inhibit the proper nourishment of the offspring, but with the male no such argument may be brought forward. In the case of the race horse, which has been studied as much as any other mammal, attempts have been made to show that it is desirable to breed young males, and again, with essentially the same data, such a position has been attacked. To-day we know far less about the seal, but it is a safe proposition to argue in favor of perpetuating, as far as possible, those fully developed males that are able to protect their harems.

### IDLE BULLS.

These animals are victims of circumstances. Owing usually to an unfavorable location, they have failed to secure harems, though they are as physically able to control them as any of their class. Furthermore, the term "idle" is a misnomer, for no one who has watched them on the rookeries would ever accuse them of being sluggish. On the other hand, they are aggressive in the extreme, and especially during the height of the season engage in frequent quarrels with the harem masters, from whom they usually pilfer a small number of cows before the close of the season.

It can not well be doubted that an excess of this class of animals is more or less of a menace to the normal, or at all events what appears to be the most successful, type of seal existence. Claims have been made to the effect that for untold ages the seal has fought the battle of life successfully and that in the present time the hand of man is not required to control his destinies. The first part of this statement is undeniably correct, but the last is open to criticism, for it assumes that the seal is to-day leading a normal existence. Unfortunately this is not true, for we know that the number of breeding cows is becoming alarmingly reduced. In the open Pacific the number of captured males and females may be approximately equal, but the Bering Sea catch, as past records show, contains from 70 to 80 per cent of females. Since, on the average, there is 1 male to every 30 cows in the harem, there must inevitably result an excess of males, an unnatural state of affairs, and the belief that in cutting down this excess we are conferring a benefit appears to rest on a firm foundation.

This season the number of idle bulls was 221, not so great a number but that they were kept at bay until the disintegration of the harems had commenced, when they usually became the possessors of a small number of cows.

### YOUNG BULLS.

Young bulls, otherwise known on the islands as "quitters", are usually 6 or 7 years old, and at the approach of man retire. They frequently haul out with the bachelors or form a shifting fringe about the group of breeding seals. In rare cases they controlled harems, usually on the margins of the rookeries, and in a few cases were seen in the act of copulation.

An accurate count of these animals was not made, unfortunately, since a considerable number had hauled out with the bachelors and could not be numbered without interfering with subsequent drives. At the height of the season the number on the rookeries was 184, and at various times 386 in all were included in the drives. Some were doubtless driven more than once, but it seems certain that the

actual number was at least 200, giving a total of 384. As the average life of the male is 13 years, of which 5 are spent as harem master, the decrease annually of the present active list is 276. It is apparent therefore that killing in the past has not been too close, and that there is a sufficient reserve at the present time.

### COUNTS OF IDLE AND YOUNG BULLS.

The following count of idle and young bulls was made at the time the census of harems was taken. It was not possible without causing undue disturbance to enumerate members of the latter class that had hauled out with the bachelors on four important rookeries—Northeast Point, Gorbatch, the Reef, and Tolstoi.

COUNTS OF IDLE AND YOUNG BULLS ON ST. PAUL AND ST. GEORGE ISLANDS, 1910.

| Rookery. | Idle bulls. | Young bulls. | Rookery. | Idle bulls. | Young bulls. |
|---|---|---|---|---|---|
| St. Paul Island: | | | St. Paul Island—Continued. | | |
| Gorbatch | 12 | 17 | Tolstoi Cliffs | 5 | 1 |
| Ardiguen | 1 | ..... | Lagoon | 3 | ..... |
| Reef | 28 | 17 | | | |
| Kitovi | 9 | 9 | Total | 144 | 136 |
| Lukanin | 5 | 11 | | | |
| Polovina | 5 | 12 | St. George Island: | | |
| Polovina Cliffs | 5 | 5 | East | 20 | ..... |
| Little Polovina | 2 | 7 | Zapadni | 19 | 17 |
| Morjovi | 1 | 1 | Staraya Artel | 17 | 21 |
| Vostochni | 29 | 26 | North | 21 | 10 |
| Zapadni | 22 | 13 | | | |
| Little Zapadni | 10 | 8 | Total | 77 | 48 |
| Zapadni Reef | ..... | 3 | | | |
| Tolstoi | 7 | 6 | Grand total | 221 | 184 |

### BREEDING COWS.

While there is a steady increase in the number of cows hauling out on any rookery for a month after the middle of June, a seagoing stream soon makes its appearance, consisting of cows en route to the feeding grounds after their pups are born. Hence at the "height of the season," about the middle of July, the number of cows on the beach is no true indication of the total number, nor does it always bear a constant ratio to the whole. Under certain circumstances, possibly due to climatic conditions, nearly the full complement may be present at the height of the season, and again in other years not over 30 per cent of the community may be on the rookery. It thus becomes apparent that such counts, of varying character from season to season, must be used with extreme caution, if at all, in estimating the entire number of females on any rookery or the annual decline or increase. As has been pointed out by others, we may arrive at an approximate estimate only by a count of the pups, and under that heading an attempt has been made to show that even here we must use the results with the greatest care in making a census of the herd.

During the height of the season counts were made on the following rookeries:

COUNTS OF COWS ON SOME ST. PAUL ROOKERIES DURING HEIGHT OF SEASON, 1897, 1909, AND 1910.

| Rookery. | 1897 | 1909 [a] | 1910 |
|---|---|---|---|
| Lagoon | 1,319 | 281 | 229 |
| Tolstoi Cliffs | 1,286 | 698 | 646 |
| Zapadni Reef | 1,049 | 137 | 78 |
| Ardiguen | 470 | 207 | 218 |
| Kitovi | 2,436 | 892 | 837 |
| Kitovi Amphitheater | 654 | 127 | 92 |
| Lukanin | | | 820 |
| Polovina Cliffs | | | 426 |
| Little Polovina | | | 421 |
| | 7,214 | 2,342 | 3,767 |

[a] Counts of Mr. George A. Clark.

## COUNTS OF PUPS.

Owing to the fact that all the cows are never present on the rookeries at a given time, it is obvious that the only approach to an accurate census of the breeding females is to be made by counting all the pups on all the rookeries. Such a procedure is not only arduous but wasteful, since the cows in early August, when the counting is usually done, are readily driven into the sea and a portion must inevitably fall a prey to the pelagic sealer. Accordingly it was the custom, for several years prior to 1906, to count the pups on a number of rookeries, and with such data estimate the entire herd. In more recent times the number of such pup counts has become gradually lessened until this year Kitovi was the only rookery examined, with the following result: Total number of pups, 1,966; dead, 62.

The implication that Kitovi is a typical average rookery must rest upon the assumption that it stands between those in which the decline is great and those in which it is at a minimum. As a matter of fact, an examination of the counts of Kitovi during the past four years shows that in reality it has been remarkably constant so far as the cows are concerned. Commencing with 1907 the number of pups each year is 1,959, 1,960, 1,979, and this year there are 1,966.

Last year there were 55 active bulls on Kitovi and 1,979 pups; this year there are 62 bulls and 1,966 pups. The average harem last year was 36; this year, 31.7; a difference due almost wholly to the increased number of active bulls. And, furthermore, this slight difference is of far-reaching importance when we come to consider the application of these data to the estimate of the entire herd. With 1,381 harems, each numbering 36 cows, the estimate would be 49,716; if each comprised 31.7 cows there are then 43,777 in the breeding herd, a difference of 5,939, or 11,878 when the pups are included in the count, due solely to the presence of 7 active, extra bulls.

Then, again, on the other rookeries an increase or decrease in the number of active males produces a corresponding rise or fall in the estimated number of cows. For example, on Vostochni there may be 6,500 cows and 200 active bulls. If 20 idle bulls, before the height of the season, secure 1 cow apiece, they enter the active list, and there are then 220 harems. As the average harem is 31.7, this increase affects the estimate to the extent of a gain of 634 cows, though in reality the number of cows has remained constant. At present this gain or loss in the active bull list outside of Kitovi is of relative unimportance, but it is conceivable that under certain circumstances it may assume a more prominent rôle.

I have in mind the fact that in treating this phase of the problem we are, after all, dealing in generalities, but the results may become so general that they have little actual value. In my opinion it is highly desirable that a pup count on all of the rookeries be made during August, or even early in September, in stress of weather, or possibly after the sealing fleet has left Bering Sea; and again a similar survey should be made five years later, when the typical rookery could be determined and questions relating to the increase or decrease of the herd be settled beyond a reasonable doubt.

## ESTIMATES OF COWS AND PUPS.

Assuming that the average harem comprises 31.7 cows, the total number in the entire seal herd is computed in the following table:

COMPUTATION OF COWS AND PUPS ON ST. PAUL AND ST. GEORGE ISLANDS, 1897, 1909, AND 1910.

| Rookery. | 1897 | 1909 [a] | 1910 | Rookery. | 1897 | 1909 [a] | 1910 |
|---|---|---|---|---|---|---|---|
| St. Paul Island: | | | | St. Paul Island—Contd. | | | |
| Gorbatch | 9,086 | 4,320 | 3,551 | Tolstoi Cliffs | 2,891 | 1,452 | 888 |
| Ardiguen | 736 | 355 | 349 | Lagoon | 2,598 | 693 | 285 |
| Reef | 13,393 | 6,624 | 6,530 | | | | |
| Sea Lion Rock | 3,009 | 2,196 | [b] 1,934 | Total | 112,023 | 41,266 | 35,504 |
| Kitovi | 5,289 | 1,979 | 1,966 | | | | |
| Lukanin | 4,100 | 1,404 | 1,299 | St. George Island: | | | |
| Polovina | 4,218 | 1,512 | 1,585 | Little East | 1,190 | 144 | 127 |
| Polovina Cliffs | 2,200 | 828 | 634 | East | 3,776 | 2,340 | 1,870 |
| Little Polovina | 1,180 | 684 | 380 | Zapadni | 3,923 | 1,548 | 1,490 |
| Morjovi | 6,873 | 1,620 | 1,490 | Staraya Artel | 1,681 | 1,512 | 1,523 |
| Zapadni | 13,511 | 5,292 | 3,740 | North | 5,782 | 3,816 | 3,266 |
| Vostochni | 26,845 | 6,624 | 6,467 | | | | |
| Little Zapadni | 5,192 | 2,232 | 1,711 | Total | 16,342 | 9,360 | 8,275 |
| Zapadni Reef | 3,041 | 319 | 222 | | | | |
| Tolstoi | 8,702 | 3,132 | 2,471 | Grand total | 128,365 | 50,626 | 43,777 |

[a] Estimates of Mr. George A. Clark. [b] Estimated.

In the above census it is to be remembered that the totals apply to cows and pups and that both together number 87,554 in 1910.

### YEARLINGS AND 2-YEAR-OLDS.

Of the various computations necessary to arrive at an estimate of the entire seal herd those concerned with the 2-year-olds and yearlings are the least satisfactory. And yet by restricting the quota of skins taken to 3-year-olds we could in a relatively short period arrive at a fairly close approximation, and at the same time settle other vexed questions that are in need of solution. At the present time we are compelled to base our estimates largely on the quota and those males dismissed from the killing grounds.

In the quota this year 10,210 skins weighed less than 7 pounds each, and 2,603 males were dismissed from the drives because they were undersized. Some of the latter were doubtless driven more than once, but even so it is probable that the number was not less than 1,800. Besides these, 337 2-year-olds were branded early in the season. This accounts for 12,347. That there are yet others is evidenced by the fact that fully 700 bachelors of killable size appeared on the hauling grounds of both islands in early August after the killing season, in addition to which there were probably other young animals in considerable numbers, though how many is uncertain. And it is probable, also, that some were at sea, but here again we have no exact information. A conservative estimate of 2-year-old males is therefore 13,000, which is also the number of virgin 2-year-old females that during the late summer arrived at the rookeries.

It appears to be the general belief that in 1909 there were 12,000 yearlings of each sex, and judging from estimates based on pup counts and the quota, the herd appears to have been stationary for the past three or four years. Hence we might suppose that the number of yearlings for this year is approximately the same as last. However, it is possible that the estimates based largely on Kitovi are misleading and that the quota was maintained by closer and closer killing. Future observations alone will settle this question. In order to be on the safe side we may assume that a shrinkage of 10 per cent has taken place and that accordingly the number of yearlings of each sex for the year 1910 is 10,800.

### THE RESERVE.

For six years prior to 1910 two thousand 2 and 3 year old males were reserved annually, but as the brand, made by clipping the hair on the head, was not permanent, we have no means of knowing how many of these were subsequently killed. If 1,000 were actually exempted each year and there is an annual mortality of 10 per cent there should be between 500 and 600 this year remaining of the reserve of 1905. And if the decline of the present number of active bulls is approximately 300 there should this year be an increase of

over 200. As a matter of fact there is a slight decline, so that it appears that males exempted one year were killed the next. In reality, if we may judge from the records of past years, there is no necessity of reserving annually a number greater than one-half of the total number of active bulls, but these should be chosen from the class that will be wigged next year, or branded with a permanent mark.

This year 1,271 males were set aside as a reserve. Very nearly 1,000 4-year-olds and older were dismissed from the drives. Some of these were doubtless driven more than once, but it is assuredly safe to conclude that 600 were actually present. In addition there were others on the water front and in the water to the number of at least 100, and finally there were 605 idle and half bulls. This gives a total of 2,576, a number considerably in excess of the requirements.

### ESTIMATE OF ALL CLASSES.

The following is an itemized estimated census of the seals forming the herd in 1910:

ESTIMATED CENSUS OF SEAL HERD IN 1910.

| Class. | 1910 |
|---|---|
| Active bulls | 1,381 |
| Breeding cows | 43,777 |
| Pups | 43,777 |
| Idle bulls | 221 |
| Young bulls | 384 |
| Bachelor reserve | 1,971 |
| 2-year males | 5,500 |
| 2-year females | 13,000 |
| Yearling males | 10,800 |
| Yearling females | 10,800 |
| Quota killed | 13,584 |
| Total | 145,195 |

According to this estimate and Mr. Clark's estimate of 158,488 for 1909, the herd has diminished by 13,293 within the past year. Whether this is a just conclusion must be decided by computations to be made during the next few years. Accuracy is impossible so long as the present methods are employed. During late years it has been assumed that the error is not greater than 12 per cent, and this is probably a fair conclusion. Last year the herd numbered between 150,000 and 160,000; this year it seems to fall between 140,000 and 150,000.

## THE QUOTA.

In 1897 it was estimated that the ratio of bachelors to the entire herd was 1:20; this year it is approximately 1:10. The conditions that have brought about this change are matters largely of conjecture, for our knowledge of the seal is too imperfect to warrant a satisfactory explanation. It is reasonably certain that the mortality among pups is less than formerly and, as Mr. Lembkey states in his report of 1909, this would insure a proportionately larger return of yearlings, males and females, and subsequently of breeding cows, both of which are factors tending to the increase of bachelors. Then again the death rate of the young, estimated to be 50 per cent during the first year, may have been excessive and the proportion of bachelors to the the entire herd may have been greater than was estimated in 1897. But even if these problems were solved to our complete satisfaction they do not bear directly on the question of the conservation of the herd. As noted in another paragraph, the essential point to be settled is regarding the reserve. If it is sufficient to supply the requisite number of males, as the active ones disappear, then it appears to be the best policy to kill those remaining. The herd is declining or at best stationary. The pelagic sealer is hovering about the islands and close killing diminishes his catch. That the quota should consist of the skins of 3-year-olds is obviously the most economical plan, but from a purely zoological standpoint this is a matter of detail and relatively unimportant.

This year 10,749 skins were taken on St. Paul and 2,834 on St. George, a total of 13,583, or 785 less than in 1909. The weights of these, together with data relating to the drives and numbers dismissed, are given in the report of the agent in charge.

## CONSERVATION AND SOME INVOLVED PROBLEMS.

It has been seen from the foregoing paragraphs that the number of males for breeding purposes is sufficient, and this has been so for many years. On the other hand the number of females has been decreasing steadily, and there is no question but that the pelagic sealer is, and has been, an important factor in producing this decline. Furthermore, another fact is evident, that with the conservation of the females on land and the setting aside annually of a sufficient male reserve no additional care will add one jot or tittle to the number of cows. It is perfectly true that the elements involved in the problem of the male reserve are intricate and some are not clearly understood, but in the last analysis the important question to be answered is this: Is there a sufficient number of males to take the place of those active on the rookeries? and every year the answer has been in the affirmative. On land, killing may be close, and skins below the

maximum value may be taken, but if the females are protected and the male reserve be adequate other questions sink into a position of relative unimportance as the seal problem now presents itself.

The foregoing paragraph is written from a purely biological standpoint, having in mind only the conservation of the herd, but there are other questions of a more practical bearing that should be settled before the sealing business can be conducted on the most economical basis. In the first place it is highly desirable that the number of pups born annually be more accurately determined, reducing the possible error below 10,000, where it stands at present. In 1896 the error was estimated to be about 6 per cent, but last year and this it is probably twice as great. With the herd approaching the vanishing point accuracy is more than ever a desideratum and should be had even at the cost of an unusual amount of labor.

Again, we have no information, within narrow limits, of the number of males or females returning at the close of the first year, or if this be beyond computation, then of the number returning the second or even the third year. This, as the sexes are of approximately equal numbers, will give more nearly than any other practicable method the number of females taking their places on the rookeries. Beyond this time observations should be made to determine the number of reserved 3-year-olds that appear the next year, and finally the percentage that ultimately becomes active on the rookeries. From such observations the reserve of males may ultimately be made with an accurate knowledge of facts, and not with such hazy ideas as we have at present.

It is highly desirable that the quota be taken from the males in prime condition, and I heartily agree with Mr. Lembkey and Mr. G. A. Clark, who argue in their reports of 1909 for the killing of 3-year-olds. I am by no means convinced that even by the branding of every pup, and so destroying the fur to some extent, we can, by this means alone, reduce the value of the skin to such a degree that the pelagic sealer will be forced out of business. It may indeed be a fact, but the brands made in the past were in some cases fatal and are supposedly about all that the young seal is able to survive, and yet not over one-tenth or at most one-eighth of the fur is destroyed. The resulting depreciation of value will probably not amount to more than $10, and two San Francisco furriers place it as low as $5. The price of skins is gradually advancing and on the other hand we do not know what returns will pay the schooner owners to keep a ship in the sea. The crew, averaging 35, receives $5 per man each month (Captain Quinan of the revenue cutter *Tahoma* says $2.50) and 12½ cents goes to each man for every skin taken by his particular rowboat. Let us suppose each schooner is out six months, and, judging from past records, 8,000 skins will be taken this year, or 320 per

schooner. If the price per skin were only $15 ($30 was the price they received last year) $4,800 would certainly be a paying investment.

On the other hand there is another factor making toward the reduction of the sealing fleet which, together with the partial destruction of the skins through branding, may possibly put the pelagic sealer out of business or, more probably, so limit the number of vessels that an equilibrium of the seal herd may become a fixed feature. This element is competition. With 25 schooners in the sea, rivalry must this year have been very keen, and with a diminishing herd some competitors must sooner or later leave the field. Any depreciation in the value of skins must hasten the desirable result, provided—and here an unknown factor enters—that the price of skins does not advance. But with the decline of the number of skins it is probable that prices will advance, and it appears very questionable whether branding and competition will drive away all of the pelagic fleet for many years to come. It may, however, make it possible for the herd to remain practically stationary until some form of treaty insures more perfect conservation.

The branding process may be made to include the male pups, but as the pelagic sealer secures but few bachelors this would greatly destroy the value of the land catch without giving adequate returns. It is possible that the males dismissed from the drives might be penned up for a month or so, but unfortunately I can not speak with authority regarding this plan, that was once put into execution several years ago. Some advocates claim that it is entirely possible; that after a few days the captives show no signs of restlessness in their unnatural surroundings. Others are equally certain that the experiment was not a success, as several of the larger animals broke through the barriers and some less fortunate became restless in the extreme and finally died of exhaustion. Furthermore, it is reported the bachelors ordinarily put to sea from time to time in search of food, and it is difficult to see how food would be forthcoming even if they desisted from their attempts to escape. The fact that placing animals in captivity would prevent redriving does not appear in itself to be sufficient reason for carrying out the plan. If by these schemes we hope to drive the pelagic sealer from his elected calling then it seems to me they will not succeed, but that they may increase the value of the land catch is possible.

### THE QUESTION OF AN EQUILIBRIUM OF THE HERD.

The question of an equilibrium of the herd is one of very high importance. In 1897 the Fur Seal Commission agreed that such a state of affairs would ultimately occur, and in 1909 Mr. G. A. Clark argues in favor of the possibility that there is now an equilibrium.

Unfortunately, in the present year a sufficiently large pup count was not made whereby to settle the question. The estimated decline may be approximately correct or it may be due to the methods of taking the census. If an equilibrium does exist it means that if the number of guards stationed on the islands is sufficient to prevent poaching the entire land catch may amount annually to something in the neighborhood of 10,000 skins and the herd would be in no danger of extinction. If instead of allowing matters to rest as they are the Government orders the branding of female pups, then some of the pelagic sealers may be compelled to abandon their calling, and the herd would probably increase, but there is nothing to prevent the return of the entire sealing fleet when the herd is larger and a profitable catch may be made even though each skin is much reduced in value.

As matters appear there is one way only whereby the pelagic sealer may be driven away entirely, and that is by the further reduction of the seal herd. This is at best a cold-blooded proposition and will probably not meet with general approval, but there seems to be no other way to destroy the activity of the fleet.

The question now stands, Shall the pelagic sealer be driven from the sea and the financial gain from the then highly diminished herd be reduced to a minimum, or is it better policy to place the business more nearly on a paying basis though the pelagic sealer share in the returns? Until pelagic sealing is discontinued by an agreement with the countries concerned the revenue fleet must be kept about the islands, under any circumstances the natives must be cared for, and in various ways a heavy financial outlay must be made annually. Personally I favor the latter plan, reaping as large a harvest as is compatible with the conservation of the herd and at the same time leaving as little as possible to those on the high seas.

### THE PATROL AND PELAGIC SEALING.

The revenue fleet maintained throughout the season of 1910 a most thoroughgoing and careful patrol about the islands, where reefs, and shifty currents, and impenetrable fogs are of the most treacherous character. Three cutters, the *Tahoma*, Capt. Quinan, commanding; the *Manning*, Capt. Cardin; and the *Perry*, Capt. Haake, constituted the fleet, with Capt. Foley at Unalaska in command. Prior to July 26 each vessel remained 12 days in the vicinity of St. Paul, and after 5 days returned from coaling at Unalaska. On the date named the *Perry*, during a dense fog, went ashore at Rocky Point on St. Paul and was never floated. The duties of the remaining vessels became correspondingly increased, but so far as known no schooner pushed inside of the 3-mile zone after this accident, and

generally speaking the infractions of the law throughout the season were of minor importance.

Pelagic sealing, on the part of the Japanese, continued with unabated vigor. During this season 25 vessels were reported, 7 more than in 1909, and the reports in Capt. Foley's office in Unalaska show that each schooner carried approximately 25 to 40 men and from 5 to 10 boats. Furthermore, several of these ships cleared from Japan early in the year, and, arriving at various points from California to Sitka, followed the herd to the breeding grounds in Bering Sea. In the vicinity of St. Paul Island, none ventured, so far as known, within the 3-mile zone, but in one or two instances violations were reported by the natives on St. George, where the revenue-cutter patrol is far less vigilant. On June 28 the *Tokai Maru* was seized and fined for violation of the alien fishing law, and on July 25 the *Toro Maru* was seized and fined for violation of the custom laws (section 2773 of the Revised Statutes). On July 18 two row boats were sighted in the vicinity of Zapadni, on St. George, so close to shore that one was seen to contain at least one unskinned seal. And again during foggy weather on July 30 two boats' crews from the schooner *Hoko Maru* landed at Northeast Point and Lukanin, respectively, and the next day 4 sailors from the *Toro Maru* were captured en route to Zapadni. Though pleading stress of weather, all were taken into custody and were subsequently tried in Unalaska.

Generally speaking, the fleet operated to the east and north of St. Paul, presumably in the path of the seals leaving the Reef, Kitovi, Lukanin, the Polovinas, and Northeast Point. On July 10 the steamer *Homer* reported at least a dozen schooners with their attendant boats, which had formed a great circle between St. Paul and St. George and were slaughtering the seals compelled to cross the line of fire at two points. Although the nearest of these vessels was at least 8 miles from the shores of St. Paul, the reports of the shotguns could be heard distinctly on land, and a count I made on that day from 11.20 to 11.50 a. m. showed that 228 shots were fired, an average of 7.6 per minute.

In this connection it may be mentioned that on certain days, owing to meteorological conditions, sounds travel amazing distances. According to Capt. Quinan, shots were heard one day in July seemingly well within the 3-mile zone, but with the lifting of the fog the nearest boat was fully 7 miles distant. Somewhat later in the month a fusilade was distinctly heard on St. Paul, but with the clearing away of the mists not a single boat could be detected even with powerful glasses used from the top of a 70-foot hill. It thus becomes apparent that alleged transgressions, based on this species of evidence alone, are far from being trustworthy.

To an outsider the practice of having Japanese stewards aboard the cutters is not above criticism. They must inevitably come into possession of valuable information that may be of service to Japanese prisoners, for whom they act as interpreters, if I am informed correctly. Furthermore, the Japanese detained for 10 days on St. Paul this year were in constant communication with the natives of the village, and it was no fault of theirs if they did not learn more of the island than is disclosed by the chart. One has a certain amount of sympathy for the pelagic sealer, who receives a mere pittance for his services and is the only sufferer when his boat is captured; but his imprisonment is not a serious hardship, especially if he be allowed to work on the coal pile at $2 per day and is ultimately sent back to Japan.

These are, after all, matters of comparative unimportance. The arrest, and even the severe punishment, of such offenders do not seriously interfere with the activities of the schooners and their owners. Such devices as branding to partially destroy the value of the skins, and of penning up male seals released from the drives, are not complete preventives, so that until an agreement is consummated the international struggle between watcher and watched must forever go on with all of the attendant aggravating features. It is possible that the herd is not in a state of equilibrium, but is actually diminishing. If this continue the hunter on the high seas must ultimately vanish from the scene of his pernicious activity; but is the Government of the United States compelled to place the seal herd on the altar of sacrifice in order to bring about this desired result?

If this, indeed, be true then we must decide, and that right early, whether this be a lesser evil than the other, hypothetical to a certain degree, of branding the females, which form the greater portion of the pelagic catch, and by the depreciation of their skins, making it necessary for a greater number than at present to be taken with profit by the pelagic sealer. At the same time this would render it possible for an increased number of cows to escape and breed on the rookeries, and so add materially to the bachelor herd and consequently to the land catch.

## THE PELAGIC CATCH.

Regarding the pelagic catch of this year, our evidence must rest upon a very slender reed—the reports of the Japanese themselves. According to these, 4,213 skins were taken prior to August 15, of which 2,098 came from Bering Sea. Last year the reported Japanese catch up to August 15 was 4,954 skins. As a matter of fact, it was then probably twice as large, for the entire season's catch, as reported from the London market, was 10,561 skins. This year it is safe to predict that there will be at least 8,000.

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 80.5 | 80 | 57.4 | 1.02457 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 80.5 | 81 | ..... | ..... | ..... | 12′ Tnr.; m. b. | botm... | 20 | S. 26° W.. | 1.0 | |
| ..... | ..... | ..... | ..... | ..... | dip. e. l..... | surf.... | 2 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dip. e. l..... | surf.... | 2 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | diving..... | 4–8 ft... | 3 00 | ..... | ..... | Coral heads taken ashore. |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 5–12 ft.. | 2 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dip. e. l..... | surf.... | 1 30 | ..... | ..... | |
| 84 | 80 | ..... | 1.02489 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 79 | ..... | ..... | ..... | 12′ Agz.; 2 m.b. | botm... | 20 | N. 72° W.. | 0.6 | Lead line carried away. |
| 84 | 80 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 80 | ..... | ..... | ..... | 12′ Agz.; 2 m.b. | botm... | 20 | N. 27° W.. | 0.6 | |
| 85 | 80 | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 80 | ..... | ..... | ..... | 12′ Agz.; 2 m.b. | botm... | 20 | N. 15° E.. | 0.6 | 1 mud bag carried away. |
| 83 | 80 | ..... | 1.02457 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 04 | S. 45° E... | 0.2 | |
| 83 | 80 | ..... | 1.02477 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 82 | ..... | ..... | ..... | 12′ Agz. rev.; m. b. | botm... | 20 | N. 70° W.. | 0.8 | |
| ..... | ..... | ..... | ..... | ..... | dyn..... | 8–20 ft.. | 1 00 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | dip.; e. l..... | surf.... | 1 30 | ..... | ..... | |
| 81 | 78 | ..... | 1.02461 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 78 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 18 | N. 13° E.. | 0.5 | |
| 87 | 80 | ..... | 1.02503 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 88 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 11 | W..... | 0.5 | 1 bridle-stop carried away. |
| 89 | 80 | ..... | 1.02442 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | Sounding lead carried away. |
| 89 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 4 | ..... | ..... | Fouled bottom; mud bag torn; no distance made. |
| 91 | 81 | ..... | 1.02514 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 91 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 45° W.. | 0.6 | |
| 88 | 77 | ..... | 1.02482 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 88 | 77 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 15 | S..... | .6 | |
| 82 | 80 | ..... | 1.02468 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 82 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 77° W.. | 1.1 | |
| 85 | 80 | ..... | 1.02447 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | S. 72° E... | .4 | |
| 82.5 | 80 | ..... | 1.02523 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 82.5 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 18 | S. 51° E... | .7 | |
| ..... | ..... | ..... | ..... | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 78 | ..... | 1.02509 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 78 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 10° W . | .8 | |
| 82 | 78 | ..... | 1.02495 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 82 | 78 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | ..... | ..... | ..... | Net fouled bottom; 1 bridle stop carried away; no distance made. |

in 1909, and not one was detected this year. The dead pups dissected showed no lesions whatever, their emaciated appearance and empty alimentary canal indicating death from starvation.

## AGES OF SEALS.

Last year 34 branded cows that had been marked as pups not later than 1902 were observed on the rookeries. This year 11 were seen prior to August 1, but during this time there is little opportunity to examine the cows critically, and later in the season such an examination would produce an unwarrantable disturbance on the rookeries. However, the fact is established that there are branded cows in existence, and the time of their disappearance and their possible age may be decided at a later date. It is interesting to note that two cows on St. George bore the T brand of 1899.

Practically every active bull on both islands was examined critically, but not a single brand was seen and none was reported by the government agents or the natives. The branded bull on Kitovi, which last year completed his fifth season, has disappeared. Another bull, blind in one eye, occupied a site on Kitovi for the third season. In other years bulls with scars or other distinguishable marks have been seen at various stations, but these have rarely continued on the active list for more than three or four seasons. It is therefore an established fact that under ordinary circumstances the male becomes active at 8 years of age and lives three or four years thereafter. The age of the female is not known with the same degree of certainty, but it is commonly believed that she lives to the same age.

## APPENDIX—EXTRACT FROM FIELD NOTES.

Beginning early in August, the harems begin to show signs of disorganization; the majority of the cows have been served and are free to come or go without serious let or hindrance; the idle and half bulls roam about at will and the breeding season thus passes into its last stage. From this time on observations producing no unwonted disturbance are to be made only from some place of concealment, such as are supplied by the cliffs of Ardiguen or Lukanin. To these two spots I repaired practically every day in August, and for varying lengths of time watched the life of the seal herd. It is unnecessary to detail observations that have already been recorded by several students of the subject, but I may voice again the general verdict that such a show of mammalian life is to be met with nowhere else on the face of the earth, and from several points of view it would indeed be a calamity if the seal meets the fate of the manatee, the sea otter, or the buffalo.

Concerning other life on the islands, much has been said and much remains to be investigated. For many years the bird life has received the attention of the ornithologist and the more important phases of the problems involved have probably been settled; yet there are other matters of minor detail relating to stray migrants, nest materials, and construction and feeding that well deserve attention.

The insects of the islands are numerous and of all the animals or plants doubtless afford some of the most important and interesting problems, if not the very greatest, of purely scientific character remaining to be solved. Owing to the brevity of the summer season, some of the stages in the life history are completed in a surprisingly short space of time, and a comparison of the life histories of related insects in adjoining regions would be interesting to say the least. Furthermore, the conditions under which they survive the winter will also be an interesting chapter in the life of the island organisms.

The flowering plants have been the subject of much study, and it is doubtful if many novelties will be recorded in the future. To a less extent this is true of the lichens, but there are unquestionably small species that have escaped detection; and again there are modifications due to habitat that make it altogether possible that superficially similar forms may in reality be distinct species. Among the fungi there are certainly new forms. On some of the upland slopes in the early season I have found species that do not correspond to any described in the reports of the region.

It is highly desirable that a museum be installed on the islands, containing, so far as is practicable, specimens of all the animals and plants. And equally desirable is a library, comprising all works that in any way are concerned with the biology of the country.

Finally, one word relating to the natives. Considering their antecedents, and especially their former mode of life and lack of advantages, these people have made truly remarkable strides, and yet there is obviously room for improvement. By nature conservative, they are somewhat nonplastic, but at heart they are anxious to better their condition, and they do respond with comparative readiness to all uplifting influences. In matters relating to personal hygiene there is much to be desired, and, improved, their span of life will doubtless be lengthened to a very noticeable degree. And, again, it is highly desirable that during the long and confining winter both the men and women have something to occupy their time—something profitable and yet agreeable, and if possible with a resulting value in some larger community. It is difficult to decide what is best. Numerous plans have suggested themselves, but none of them are free from certain inherent difficulties, and I earnestly hope that those more competent may give the subject their serious consideration, for certainly this species of missionary work carries a rich reward.

In addition to the questions here outlined are others of deep import. Years ago Darwin called attention to the remarkable similarity of the animals on the Galapagos Islands to those on the western slope of South America, and on the basis of this likeness formulated his theory of evolution. Doubtless on the Pribilof Islands the same conditions exist when compared with others of the mainland. Extensive breeding experiments are being carried on in several sections of our country, but it is by no means certain that new species are created in the period measured by a man's life or even in a hundred years. On the islands, however, in a normal habitat, evolutionary agencies have doubtless made their influence felt, even though the islands are geologically young. It seems therefore wise to make extensive collections of the island fauna and flora, to study these critically, and, finally, to compare them with related species on the mainland. These results might be very interesting when considered in connection with the newly formed island of Bogoslof. On this body of land, forced above the sea within the memory of man, we already find plants thriving, and there are doubtless animals on the land or along the shore. Even if there are no visible differences between organisms on this island and those of the Aleutian chain, we may gain some insight into the means whereby their transportation has been accomplished, and if collections and careful notes are kept in the near future the evolutionary side of the subjects may be studied sometime in the years to come.

# THE FUR-SEAL FISHERIES OF ALASKA IN 1910

By WALTER I. LEMBKEY
*Agent in Charge*

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Bureau of Fisheries Document No. 749

# CONTENTS.


Page.

The new administration ..... 3
Increased scope of agents' duty ..... 3
Hire of vessel and purchase and transportation of supplies ..... 4
Employees ..... 5
Transfer of lessee's property ..... 6
Natives' affairs ..... 8
Supply depot ..... 9
Bank accounts ..... 10
Resources of natives ..... 11
Census of inhabitants ..... 12
Management of seal herd ..... 12
Marking of bachelors ..... 12
Statistics of killing ..... 14
Skins shipped ..... 14
Record of drives ..... 15
Weights of skins taken ..... 19
Enumeration of breeding herd ..... 21
Counts of harems ..... 21
Counts of pups ..... 23
Number of breeding cows ..... 23
Census of entire seal herd ..... 24
Estimate of half bulls ..... 24
Estimate of 2-year-olds ..... 24
Number of yearlings ..... 25
Number of 3-year-olds ..... 25
Summary of seal life in 1910 ..... 25
Pup-raising experiments ..... 26
Pelagic sealing ..... 28
Wreck of revenue-cutter Perry ..... 29
Foxes ..... 29
Conditions and trapping on St. George ..... 30
Trapping on St. Paul ..... 31
Recommendations ..... 31
Killing of bachelor seals ..... 31
Support of natives ..... 33
Scheme of compensation of natives ..... 36
Natives on the Aleutian Archipelago ..... 36
Manual training for natives ..... 39
Fire protection for Pribilof Islands ..... 40

# THE FUR-SEAL FISHERIES OF ALASKA IN 1910.

By Walter I. Lembkey,
*Agent in charge.*

## THE NEW ADMINISTRATION.

With the passage of the act of April 21, 1910, the leasing system, which since 1870 had required that the sealing right on the Pribilof Islands be let in 20-year periods to the highest bidder, was abrogated. This new law neither suspended the killing of seals on the islands nor required it to be curtailed, but provided that such killing should be done only by the authority of the Secretary of Commerce and Labor through officers, agents, or employees of that Department, the natives to be employed to perform the labor necessary to secure the sealskins and to receive fair compensation for their labor. So also the sealskins taken under the authority and by the persons already mentioned should be sold by the Secretary to the best advantage of the Government.

By this act the Secretary of Commerce and Labor was given authority also to appoint such additional officers, agents, and employees as may be necessary to carry out the provisions of the act; to purchase at a fair valuation the plant of the former lessee on the islands; to establish and maintain supply depots on the Pribilof Islands; to provide for the transportation of supplies by the charter of vessels; and, finally, to furnish food, fuel, clothing, and other necessaries of life to the natives of the Pribilof Islands, and to provide for their comfort, maintenance, education, and protection.

## INCREASED SCOPE OF AGENTS' DUTY.

This act placed upon the Department heavy responsibilities which hitherto had been borne by the lessee. The business of killing seals and curing the skins, the mercantile business with a stock of approximately $40,000 worth of goods, and, in short, all other practical affairs, were required to be actively managed by the Department agents, who previously had occupied the virtual status of inspectors of the lessee's operations, in addition to the duty of examination of the seal herd and the administration of the natives' affairs.

The act mentioned had not been approved by the President before those charged with the management of the seal fisheries were giving their attention to the working out of the details under the new con-

ditions. On May 9 the annual instructions to the agent in charge were signed; shortly afterwards $2,000 in cash was advanced to the agent to pay for labor on the islands other than that of killing seals, bonds being given by himself and assistant agents to insure the proper handling of this fund and the faithful performance of duties in general. On May 17 the agent in charge left Washington to begin the preparations for carrying out the requirements of the act of April 21, 1910.

### HIRE OF VESSEL AND PURCHASE AND TRANSPORTATION OF SUPPLIES.

On May 21 the agent arrived in San Francisco and on the 26th a charter for the steamer *Homer* at $142.50 per diem was signed, subject to the approval of the Department of Commerce and Labor. This vessel was delivered under the charter June 1, and was sent first to the coal bunkers to receive her fuel and cargo coal and thence to the covered dock of the Cosmos Line to receive freight.

After the charter of the *Homer* was completed, the purchase of supplies for the natives and the islands in general was next to be taken up. It was found at once that the best prices on the goods required could not be obtained without inviting competitive bids; consequently, with the assistance of the North American Commercial Company, the retiring lessee, which placed its annual requisitions at the Department's disposal, schedules of the principal classes of merchandise were prepared in triplicate and presented to three of the largest mercantile firms in the several lines of business, with the request that each submit a bid in writing. All merchandise, with the exception of small articles of miscellaneous classification, was thus purchased from the lowest bidder, after a careful inspection of the goods to determine whether the quality as well as the price was satisfactory.

It was necessary to visit in person the place of business of each firm to solicit these bids; to go again to make purchases, and again to deliver the vouchers in payment of the articles purchased. With this and the attendant clerical work, it is considered that no time was wasted in the preparations incident to the sailing of the supply ship for the islands.

During the period from June 1 to 10, the supplies were purchased and the vessel loaded. On June 11 the *Homer* sailed from San Francisco, arriving at Dutch Harbor June 24. Coaling there, she proceeded to the islands, arriving at St. George June 27 and St. Paul June 29. Having discharged all freight, she left on July 1 for Dutch Harbor to load coal for the natives' use. Delivering this coal on July 7–11, she returned to San Francisco July 23.

Taking on another cargo of merchandise, together with coal enough for the round trip to the islands, the *Homer* again left San Francisco

August 6, arriving at Dutch Harbor August 21, at St. George the 23d, and St. Paul the 24th. Having received the sealskins aboard, she left St. Paul August 28 and arrived back at San Francisco September 12.

The sealskins were taken at once to Oakland Long Wharf, where, carefully packed in casks and placed in ventilated freight cars, they left on the night of September 14 for New York and thence were shipped to London to be sold at public auction.

## EMPLOYEES.

It has already been stated that during the continuance of the leases of the two companies the Government agents on the islands were not concerned with the active management of business, but acted with regard to it merely as inspectors. This does not refer to the supervision of the natives' affairs, the management of which was never the subject of concern by any of the lessee's employees. Under these circumstances the services of the four agents were ample to oversee properly the operations of the lessee and to perform such duties as might be required of the Government's representatives. With the taking over, however, of the business which heretofore formed the exclusive concern of the lessee, an increase in the number of the Government employees on the islands became necessary.

Special biological study of the seal herd having been decided upon, a naturalist was appointed for this work, Dr. Harold Heath, of Stanford University, accepting the position until permanent arrangements could be made. The selection of the additional employees and the assignment of their duties were left to the agent. Of the force required, it was considered advisable to retain as many of the employees of the late lessee as could be used, as these men were efficient, skilled in their duties, and required no instruction other than that necessary to acquaint them with new conditions.

During the summer the force of employees on the islands, in addition to the agents and the naturalist, was as follows:

| Name. | Position. | Period. | Annual salary. |
|---|---|---|---|
| On St. Paul Island: | | | |
| A. H. Proctor | Storekeeper and bookkeeper | Indefinite | $1,800 |
| S. Melovidof | School-teacher | do | 1,200 |
| H. C. Mills | Physician | Until fall | 1,200 |
| [Chinese] | Cook | Indefinite | 720 |
| N. Bogadanof | Stockman | do | 300 |
| [Selected natives] | Janitor Government house | do | 240 |
| Do | Janitor former company house | do | 180 |
| On St. George Island: | | | |
| James Murtha | Storekeeper | Until fall | 1,200 |
| C. M. Cunningham | Physician | do | 1,200 |
| Ned B. Campbell | School-teacher | Indefinite | 900 |
| [Chinese] | Cook | Until fall | 720 |
| M. Lestenkof | Stockman | Indefinite | 300 |
| [Selected natives] | Janitor Government house | do | 240 |
| Do | Janitor former company house | do | 180 |

Mr. Proctor assumed his duties with the idea of serving during the winter on St. Paul. Subsequently, by an order of Secretary Nagel, made during the Secretary's visit to St. Paul, Mr. Proctor was transferred to St. George as acting assistant agent, in place of Assistant Agent Clark, who returned to the Department. Dr. Mills served only during the summer, returning to his home at his own request. The Chinese cooks on both islands were relieved at their own request by others brought up from San Francisco. Assistant Agents James Judge and E. W. Clark with Agent Lembkey returned to the Department on the *Homer*.

Messrs. Murtha and Cunningham served only during the summer, as was contemplated when they were first appointed. Dr. Pedro de Figanière was sent up by the Department to take the place of Dr. Cunningham. Mr. Campbell was appointed by the Department. All others were appointed provisionally from the force on the islands.

During the ensuing winter the force of employees on the two islands will be as follows:

St. Paul: H. D. Chichester, assistant agent in charge; Walter L. Hahn, naturalist; Norman P. Morgan, physician; S. Melovidof, school-teacher; a Chinese cook; and N. Bogadanof, stockman.

St. George: A. H. Proctor, acting assistant agent; P. de Figanière, physician; Ned B. Campbell, school-teacher; a Chinese cook; and M. Lestenkof, stockman.

The respective assistant agents are performing their usual duties in addition to those heretofore devolving upon the lessee's agents. When it is considered also that the office force of the lessee in San Francisco, with over $20,000 in salaries, has been eliminated, it will be seen that the island service, while highly efficient, is conducted at a minimum of expenditure. No increase in administrative force has occurred. A bookkeeper, two physicians, and two school-teachers only have been added, in addition to cooks and miscellaneous native help.

## TRANSFER OF LESSEE'S PROPERTY.

By a letter dated May 7, 1910, from the Commissioner of Fisheries, the agent was directed to confer with the North American Commercial Company and if possible to arrive at a fair and just valuation to be placed upon the property of that company on the Pribilof Islands, with a view to purchase by the Government.

Two days after arrival at San Francisco a conference was had with the company, at which a statement of the presumed value to the Government of the company's holdings on the islands was made. After consideration of the question the company several days later agreed to transfer the Pribilof Islands plant at the valuation proposed at the previous conference.

Upon arrival at the islands an inventory as of June 30 was taken. Later, the transaction having received the approval of Secretary

Nagel, who personally visited the islands and inspected the plant, vouchers were drawn to cover the various amounts shown on the inventory according to the basis of settlement proposed and accepted, and were transmitted to the Department for settlement.

A recapitulation of the inventories on the two islands, as taken on June 30, 1910, with a memorandum of the basis of settlement, follows:

ST. PAUL ISLAND.

| Company's inventory. | | Settlement price. | |
|---|---|---|---|
| Merchandise | $5,154.33 | San Francisco invoice cost | $5,154.33 |
| Tools and implements | 3,522.83 | 50 per cent of inventory | 1,761.41 |
| Drugs and instruments | 816.63 | Inventory cost | 816.63 |
| Household furniture | 2,957.22 | 25 per cent deducted from inventory | 2,217.92 |
| Dispensary furniture | 159.97 | Do | 119.98 |
| Boats and bidarras | 3,835.40 | Launch $2,000 | |
| | | Boat 400 | |
| | | Do 275 | |
| | | 3 bidarras, at $175 each 525 | 3,200.00 |
| Telephone line | 367.79 | Lump sum | 90.00 |
| School supplies | 276.29 | Do | 257.00 |
| Company buildings | 25,683.45 | 50 per cent of inventory | 12,841.72 |
| Native dwellings | 17,269.11 | Do | 8,634.55 |
| Sea-lion skins | 138.00 | Inventory cost | 138.00 |
| Live stock | 967.62 | Do | 967.62 |
| Salt and twine | 1,260.02 | Do | 1,260.02 |
| Fox skins (traps, etc) | 61.88 | Do | 61.88 |
| Library | 1,012.86 | Lump sum | 200.00 |
| Wharf ways and derrick | 804.63 | 50 per cent of inventory | 402.31 |
| Coal, 66 tons 1,339 pounds, at $20 | 1,331.97 | Same, at $17 | 1,132.17 |
| Total | 65,620.00 | Total | 39,255.54 |

ST. GEORGE ISLAND.

| | | | |
|---|---|---|---|
| Merchandise | $6,352.03 | San Francisco invoice cost | $6,352.00 |
| Coal, 38 tons, at $20 | 760.00 | Same, at $17 | 646.00 |
| Dispensary | 718.97 | 50 per cent of inventory | 359.48 |
| Live-stock account | 313.72 | Inventory cost | 313.72 |
| Groceries, company house mess | 227.73 | San Francisco invoice cost | 227.73 |
| Salt and seal twine | 198.10 | San Francisco invoice cost after inspection | 198.10 |
| Old salt | 98.87 | Do | 98.87 |
| Sea-lion skins | 85.71 | Inventory cost | 85.71 |
| Boats and bidarras | 1,215.96 | Lump sum | 700.00 |
| Company buildings | 11,604.04 | 50 per cent | 5,802.02 |
| Derrick and landing (including cars and track) | 1,737.23 | Do | 868.61 |
| House and office furniture | 2,043.63 | 25 per cent deduction | 1,532.72 |
| Library | 670.64 | Lump sum | 100.00 |
| Native dwellings | 6,646.96 | 50 per cent | 3,323.48 |
| Telephone | 297.25 | Do | 148.62 |
| Tools and implements | 1,164.47 | Do | 582.23 |
| Total | 34,135.31 | Total | 21,339.32 |

The foregoing lists represent a total valuation for both islands of $60,568.17. Subsequent deductions because of errors in addition, computation, etc., reduced this amount by $26.69. A final settlement was made by the Department for $60,541.48 and checks for that amount were transmitted to the company.

With the exception of the buildings, practically everything on the inventory represents new stock, purchased by the company during its lease and not acquired from the former lessee. With regard to the buildings it may be said that, although erected by the former lessee, they have been kept from deterioration by constant repair and could not be replaced for anything approaching the price paid for them by the Government. On St. George the company's

dwelling house and warehouses were virtually rebuilt by the late lessee, when also several new native dwellings were added. On St. Paul constant repairs were made to all the buildings during the period of the lease, and the buildings not only are habitable but efficient. When it is considered furthermore that only 50 per cent of the inventory valuation was paid for these buildings, it may be seen that the price was not excessive.

## NATIVES' AFFAIRS.

Upon the agents' arrival at the islands considerable anxiety was found to have existed in the minds of the natives and others as to the time of arrival of the supply ship and the arrangements which might be made for the conduct of affairs under the changed conditions. Through the revenue cutters which touched at the islands previous to the arrival of the *Homer*, information had been received of the assumption of active management by the Government, but no intimation as to what efforts were being put forth by the Department for taking charge of the practical affairs. This anxiety had been heightened by the fact that the supply of some articles of necessity, as food on St. Paul, had been almost consumed. In fact, to provide against an imminent shortage it had become necessary in the early part of June to obtain by the revenue cutter *Manning* a quantity of flour, biscuits, salt beef, and canned vegetables from Dutch Harbor. In addition to this fear of impending famine, the natives had received the impression that they would be obliged to labor for the Government without any compensation other than clothing and food, as had been actually the case under the Russian régime.

The agents' first effort, therefore, was to allay these impressions and to establish relations of confidence with the natives, though, as a matter of fact, the arrival of a shipload of supplies and of a gunny sack containing about 150 pounds of coin had the effect automatically of removing the greater portion of this uncertainty. In addition, conferences were had with individual natives and with the assembled communities, in which the changes which had occurred during the past season were explained and assurance was given that the intention of the Government was to improve the present condition of the natives wherever possible rather than to make it less favorable than under the late lessee.

It was necessary specifically to reassure them that cash payments for sundry labor would be continued under the new management. This has been the source of almost all the cash received by the natives, and the loss of it the occasion of their chief anxiety. The assurance of the continuation of these payments in cash, together with the increase in the rate of payment for taking sealskins, and the material reduction in the prices at which merchandise is to be sold to the natives out of the stores on the islands, all had the effect of

restoring confidence and obtaining a renewal of the natives' good will.

*Supply depot.*—Immediately upon the arrival of the *Homer* all hands not entirely occupied with sealing began taking an inventory of merchandise and other property belonging to the company, with a view to its being taken over by the Government, in accordance with instructions contained in the letter to the agent in charge dated May 7, 1910. This inventory was prepared in time to be transmitted on the return of the *Homer* on her first trip.

After completing the inventory the merchandise which arrived on the *Homer* was uncrated and checked with the invoices. The price was marked on the articles at the rate fixed in the instructions of the agent, namely, a flat rate of 33⅓ per cent advance over San Francisco wholesale prices. The prices of those articles of merchandise also which were taken over from the company were made to conform to the prices fixed for the new invoices of goods.

The application of this flat rate of 33⅓ per cent advance had the result of selling merchandise to the natives at lower prices than ever before in the history of the islands. Because of high market prices in San Francisco at the time the spring requisition was purchased the retail price of butter was increased from 35 cents to 42 cents; flour remained the same, at $1.75 a quarter barrel; lard was raised from 18 cents to 21 cents a pound; rubber boots, from $6 to $6.35 a pair; canned beef from 30 cents to 35 cents each. Some few other articles were sold at the same rate as formerly; all other prices were reduced. A statement of some of these reduced prices follows:

| Articles. | Former price. | Present price. | Articles. | Former price. | Present price. |
|---|---|---|---|---|---|
| Apples: | | | Needles | $0.05 | 2 for $0.05 |
| Canned | $0.25 | $0.20 | Oil: | | |
| Evaporated | 2 for .30 | 3 for .25 | Coal | .40 | .26 |
| Apricots, canned | .25 | .20 | Cottonseed | .35 | .25 |
| Arctics: | | | Onions | .06½ | .05 |
| Men's | 2.25 | 1.90 | Peaches, canned | .25 | .20 |
| Women's | 1.50 | 1.35 | Pears, canned | .25 | .20 |
| Beans, canned | .20 | .15 | Peas | .20 | .15 |
| Bedspreads | 2.25 | 1.70 | Potatoes | .03½ | .02½ |
| Beef, salt | .12½ | .09 | Baking powder | .20 | .15 |
| Blackberries, canned | .25 | .20 | Prunes | .15 | 3 for .25 |
| Blankets | 7.00 | 5.50 | Raisins | .15 | 3 for .25 |
| Calico | .10 | 3 for .25 | Rice | 3 for .25 | 3 for .20 |
| Candles | .02½ | .02 | Worcestershire sauce, American | .25 | .15 |
| Candy, 2 pounds | .50 | .25 | Shoes: | | |
| Chimneys, lamp | .15 | 2 for .15 | Babies' | .75 | .55 |
| Coffee | .25 | .20 | Do | 1.25 | .90 |
| Collars, white | .25 | 2 for .25 | Boys' | 3.00 | 2.00 |
| Corn, canned | .20 | .15 | Children's | 2.50 | 1.75 |
| Crackers: | | | Do | 2.00 | 1.40 |
| Soda | .10 | 3 for .25 | Men's | 4.00 | 3.15 |
| Sweet | .20 | .15 | Misses' | 2.50 | 1.75 |
| Cups and saucers, set | .20 | .15 | Women's | 3.00 | 2.35 |
| Dress goods | .60 | .50 | Do | 4.50 | 2.60 |
| Ewers and basins, set | 2.00 | 1.25 | Swiss, dotted | .25 | .15 |
| Gingham | .15 | 2 for .25 | Soap | .06½ | .05 |
| Gloves, men's, wool | .50 | .25 | Socks | .50 | .45 |
| Knives, pocket | .40 | .30 | Tea | .50 | .25 |
| Jams | .25 | .20 | Tobacco, leaf | .50 | .40 |
| Jelly | .25 | .20 | Tomatoes, canned | .20 | .15 |
| Lining, cotton | .15 | .12½ | Trousers | 5.00 | 4.00 |
| Milk, condensed | .25 | .20 | | | |

On every weekly order issued a saving of from 75 cents to $1.50 was made by reason of these reduced prices. In addition the price of coal was reduced from $20 a ton to $12.75 plus a small charge for stevedorage at either end. While no accurate computation has yet been made, it is believed that by reason of the reduced prices of commodities sold the purchasing power of the natives will be increased by several thousands of dollars.

*Bank accounts.*—When the Alaska Commercial Company in 1870 began taking seals under its lease, in addition to providing comfortable dwellings for the native inhabitants, it also endeavored to encourage thrift among them by receiving deposits of money from such natives as desired to open savings accounts. On these accounts, which were subject to check at all times, the company paid interest at the rate of 4 per cent on balances found on May 31 of each year. During the period of this company's lease some natives had accumulated accounts of over $2,000 each.

These accounts were taken over by the North American Commercial Company when it succeeded to the sealing privilege in 1890. While during the 20-year lease of the latter company these funds on deposit became smaller, due to the lessened amounts earned by the natives and to distribution to nonresident heirs upon death of the owner of the account, there still remained a few so-called bank accounts in the hands of the North American Commercial Company at the time of the expiration of its lease.

When the contract of the North American Commercial Company expired in 1910 these funds remained on deposit with it, and some action with reference thereto became necessary on the part of the Government, which then took over the active management of the business.

In the instructions dated May 9, 1910, it was directed that if the balance on the bank account of any native was small it should be paid by the company directly to the native; if, however, the native desired, it should be held by the company and deposited in a safe financial institution in San Francisco by the agent in charge as attorney in fact for the benefit of the native owning the account, the interest to be collected annually and paid directly to the native.

Upon arrival at the islands last spring the natives were informed of the situation and told that if they desired their money could be deposited in a bank in San Francisco previously selected, which would pay interest at the rate of 3½ per cent per annum. They all assented to the redepositing of their funds in the manner stated.

Such small accounts as did not exceed $25 were paid to the owner in cash by the company; the accounts of larger amount than that stated were closed by the company's presenting the respective owners with drafts for the several amounts.

Each native who possessed one of these drafts delivered the same to W. I. Lembkey and upon blanks previously provided signed a power of attorney to him authorizing him to deposit the drafts with a bank in San Francisco, to collect the amount of any interest due thereon and to give receipts for the same.

A list of the accounts and the persons to whom they belong follows:

| St. George Island: | |
|---|---|
| Fevronia Galanin | $40.00 |
| Dimitri Lestenkof | 137.00 |
| Michael Lestenkof | 240.00 |
| Peter Prokopiof | 83.55 |
| Emanuel Zaharof | 33.20 |
| Zoya Swetzof | 123.00 |
| Mary Galanin | 245.00 |
| Michael Shane | 63.55 |
| Mary Philamonof | 90.05 |
| Total | 1,055.35 |

| St. Paul Island: | |
|---|---|
| Alexander Merculief | 170.00 |
| Nekita Hopof | 50.00 |
| Agrifina Bogadanof | 161.10 |
| Marina Stepetin | 40.00 |
| Apollon Bourdukofsky | 203.30 |
| Parascovia Kozlof | 150.00 |

| St. Paul Island—Continued. | |
|---|---|
| Peter Bourdukofsky | $130.00 |
| Elizabeth Rookavishnikof | 40.00 |
| Agrifina Fratis | 71.00 |
| Agrifina S. Pankof | 285.00 |
| Peter Oustigof | 140.00 |
| Alexander Melovidof | 235.00 |
| Julia B. Krukof | 170.00 |
| Simeon Fratis | 71.00 |
| Akalina Fratis | 426.00 |
| Alexai Emanof | 230.00 |
| Tekan Volkof | 966.00 |
| Martha Fratis | 71.00 |
| John Hansen | 370.00 |
| Oulianna Fratis | 71.00 |
| Total | 4,050.40 |
| Grand total | 5,105.75 |

The St. Paul drafts were deposited to the credit of W. I. Lembkey, trustee for the various natives. Separate accounts were opened with each fund and pass books provided to be delivered to each native owning the account. In cases where the money was owned by a minor child, the account was opened in the name of its natural guardian—either one of its parents, or if an orphan, the person with whom it resides—with Agent Lembkey as trustee for the guardian.

Upon taking the St. George drafts to the bank it was discovered that by an oversight they had not been indorsed by the persons in whose favor they were drawn. Unfortunately, therefore, they could not be deposited. An arrangement was made with the North American Commercial Company, however, whereby the amount of these St. George drafts, $1,055.35, was deposited by the company to protect the drafts which it will be necessary to take back to St. George Island for proper indorsement. After being so indorsed they will be paid by the bank and savings accounts opened with each of the persons named, in the same manner as the drafts from St. Paul.

The interest on these accounts will be collected annually and paid to the proper persons. The receipts for money so paid will be submitted with the annual report.

*Resources of natives.*—During the summer of 1910, from taking seals, and the previous winter from trappings foxes on St. George,

the natives of the islands earned the following amounts, to be applied to their support:

| | |
|---|---|
| St. George: | |
| 203 blue foxes, at $5; 9 white, at $1 | $1,024 |
| 2,834 sealskins, at $1 | 2,834 |
| St. Paul: | |
| 664 sealskins, at 75 cents | 498 |
| 10,088 sealskins, at $1 | 10,088 |
| Total | 14,444 |

As the fox skins were delivered to the North American Commercial Company, that company paid directly to the agent on St. George for the natives the amount of $1,024, due the natives on that account. The company also paid in cash to the agent on St. Paul the $498 due the natives from the 664 sealskins which the Department authorized the company to take to complete its quota of 15,000 for 1909. The amounts of $10,088 earned by the St. Paul natives and $2,834 earned by the St. George natives for taking the sealskins shipped on Government account in 1910 were credited to the natives on the island books. Payments of cash therefrom were not made except of small sums in very rare instances. Each native sealer, however, was allowed to draw supplies against this fund at a fixed rate each week until the cost of such supplies equaled the amount of the native's credit from earnings; after this, supplies to be issued to him directly from the stores in sufficient quantity to support himself and family.

The various statements of the division of natives' earnings are filed in the Bureau of Fisheries at Washington.

*Census of inhabitants.*—On St. Paul, on June 30, 1910, there were 198 resident natives, including 98 males and 100 females, a net increase of 5 over the previous census. During the year 13 births, 1 arrival, and 9 deaths occurred.

On St. George, at the same date in 1910, 91 natives were present, of which 45 were males and 46 females. Six births and 2 deaths occurred during the year, leaving a net increase of 4 in the population.

Detailed censuses are filed in the Bureau of Fisheries at Washington.

## MANAGEMENT OF SEAL HERD.

### MARKING OF BACHELORS.

The general instructions to the agent, dated May 9, 1910, required that not any 2-year-old bachelors but only 500 3-year-old bachelors should be marked to form the breeding reserve. This was predicated upon the assumption that the 500 3-year-olds so reserved would be over 14 per cent of the whole number of such young males in the herd. Subsequently, by a telegram from the Secretary dated June 6, which, not having been delivered, presumably through the fault of the telegraph company, was repeated June 10, the number of

3-year-old males to be reserved by marking was increased from 500 to 1,000.

These were apportioned between the two islands, by assigning 800 to St. Paul and 200 to St. George, for the reason that there are in round numbers four times as many breeding seals on St. Paul as on St. George. Upon arrival at St. George Island a copy of the annual instructions was given to Assistant Agent Clark, and he was also informed that the quota of bachelors to be reserved on St. George was 200 3-year-olds. As the vessel remained at St. George only a few hours, and as numerous other matters required consideration, it was not possible to put into writing the various explanations of the instructions.

Upon my return to St. George Island two weeks later I was informed by Agent Clark that the quota of marked bachelors had been secured. No statement of the number so marked, however, was made, and at the close of the season among the data received detailing the season's work on St. George no mention was made of the number of bachelors branded. Upon meeting Agent Clark on the *Homer* after he had left St. George for San Francisco, upon specific inquiry I ascertained for the first time that the instructions were misapprehended by him and that he had sought to brand on St. George only 100 3-year-olds, and did actually brand only 108 of that class of young males. He had not the memoranda showing the dates on which drives were made for this purpose and the number secured from each drive. As the season then had been closed for three weeks it was useless to cause the marking of an additional number to make up the deficiency in the breeding reserve for that island.

On St. Paul, however, more young males were branded than the total number for both islands required by the instructions. Previous to my arrival on that island, on June 29, with the current instructions, Assistant Agent Judge, acting under the instructions for the previous year, had already marked 337 2-year olds in addition to 279 3-year-olds, 14 4-year-olds, and 5 5-year-olds. After my arrival additional 3-year-olds only were marked to complete the number of that class required for St. Paul. A record of the bachelors marked on St. Paul, showing also dates and rookeries driven from, follows:

RECORD OF BACHELORS MARKED ON ST. PAUL ISLAND FOR BREEDING PURPOSES, SEASON OF 1910.

| Date. | Rookery. | Two years. | Three years. | Four years. | Five years. |
|---|---|---|---|---|---|
| June 17 | Reef | 46 | 77 | ..... | ..... |
| 27 | Zapadni | 82 | 56 | ..... | ..... |
| 28 | Reef and Gorbatch | 209 | 146 | 14 | 5 |
| July 2 | Northeast Point | ..... | 246 | ..... | ..... |
| 4 | Reef | ..... | 191 | ..... | ..... |
| 5 | Zapadni | ..... | 91 | ..... | ..... |
| | Total | 337 | 807 | 14 | 5 |

The total number of bachelors marked on both islands, therefore, would be as follows: 2-year-olds, 337; 3-year-olds, 915; 4-year-olds, 14; 5-year-olds, 5; total, 1,271.

The report of London trade sales this year shows that 5,006 large pup and middling pup skins (which are accepted to be those of 3-year-old bachelors) appeared in the 1910 catch. Adding to these the 915 reserved 3-year-olds would make a total of 5,921 of that class which we might claim were in the herd in 1910. Of this whole number, the number reserved (915) is over 15 per cent.

Two-year-old males were not required by the current instructions to be reserved, for the reason that the number of 2-year-olds having skins of 5 pounds and under, together with those 2-year-olds which would not appear in the drives at all, of which there are always some, it was believed would be sufficient to supply the necessary number of 3-year-olds in 1911.

### STATISTICS OF KILLING.

*St. Paul.*—From August 9, 1909, to June 17, 1910, 6 drives of seals on St. Paul and 2 on Sea Lion Rock were made to furnish food to the inhabitants of St. Paul. From these, 1,573 skins were obtained, including 1 from a seal found dead at Rocky Point. From July 3 to 31, 29 drives were made on St. Paul for skins, in which 8,683 skins were secured. On August 10, 1910, an additional drive was made to furnish food for the natives during the coming "stagey season," from which 496 skins were secured. From the sources enumerated a total of 10,752 skins were obtained during the season ended August 10, 1910.

*St. George.*—On St. George during the so-called food-killing season, from August to November, 1909, 18 seals were killed at various dates by the guard at Zapadni; 8 drives also were made, in which 482 seals were killed, filling the quota of 500 for food allowed for that island. During the season of killing for skins, 2,314 skins were secured in 10 drives, 16 were obtained from the seals killed at various times by watchmen for food, and 4 were left in salt from the previous season, a total of 2,334, in addition to the 500 taken during the food-killing season.

### SKINS SHIPPED.

*St. Paul.*—Of the skins taken on St. Paul, 664 were delivered to the North American Commercial Company, under authority of the department's letter of January 5, 1910, to complete that company's quota of 15,000 skins for 1909. The remainder, 10,088 skins, were available for shipment on Government account. While this number

supposedly was shipped from St. Paul on the *Homer*, on August 28, word was received in October last from Assistant Agent H. D. Chichester, in charge on St. Paul, that after the departure of the *Homer* with the skins on board a bundle containing 2 sealskins was found wedged under the floor of the skin lighter or bidarra, in which crevice it had become obscured during the shipment of the skins. These two were placed in the salt house to apply on the shipment of the following year. The total number of skins, therefore, shipped from St. Paul in 1910 for Government account was 10,086.

*St. George.*—On August 23, 1910, the whole number of skins taken on St. George, from the sources enumerated (2,834), were placed on board the *Homer* to be shipped to San Francisco for Government account.

The whole number of skins from both islands, recapitulated from the data already given, is as follows:

| | |
|---|---|
| From St. Paul: | |
| By North American Commercial Company | 664 |
| By Government | 10,086 |
| From St. George, by Government | 2,834 |
| Total | 13,584 |

## RECORD OF DRIVES.

On St. Paul, during the season of 1910, no record was kept of the seals dismissed from the food drive made on June 6 on Sea Lion Rock, as the configuration of the ground there is such that the seals can not be herded, but escape in every direction upon the landing of the clubbers, who kill such as they can while the seals are running off. So also no record was kept in the drive for "branding" on June 17, from which at the same time 145 seals were killed. The record of dismissals, therefore, begins on July 3, when the drive was made at Northeast Point for "branding," at which, at the same time, the 2-year-old bachelors in the drive, not being required to be marked, were killed.

In the 32 drives made on St. Paul from July 3 to August 10, a total of 12,434 seals appeared, of which 9,179, or 73 per cent, were killed and 3,255 dismissed. Those dismissed consisted of 1,581 small, 825 large, and 849 of those marked for the breeding reserve. This killing was 4 per cent closer than during the lessee's killing season of 1909, when 69 per cent of all seals driven were killed.

SEALS KILLED AND SEALS DISMISSED FROM DRIVES ON ST. PAUL ISLAND, SEASON OF 1910.

| Date. | Rookery. | Killed. | Dismissed. | | | Total driven. | Per cent killed. |
|---|---|---|---|---|---|---|---|
| | | | Small. | Large. | Branded. | | |
| July 3 | Northeast Point | 437 | 32 | 67 | ..... | 536 | 81 |
| 4 | Reef | 331 | 48 | 31 | ..... | 410 | 80 |
| 5 | Zapadni | 166 | 48 | 31 | ..... | 245 | 67 |
| 6 | Tolstoi and Lukanin | 142 | 6 | 39 | 28 | 215 | 66 |
| 7 | Halfway Point | 77 | 2 | 9 | 3 | 91 | 84 |
| 8 | Northeast Point | 293 | 37 | 47 | 85 | 462 | 63 |
| 9 | Reef and Gorbatch | 437 | 21 | 28 | 116 | 602 | 72 |
| 9 | Tolstoi and Lukanin | 120 | 2 | 17 | 5 | 144 | 83 |
| 10 | Zapadni | 198 | 10 | 18 | 32 | 258 | 76 |
| 14 | Northeast Point | 407 | 16 | 35 | 15 | 473 | 86 |
| 14 | Polovina | 5 | ..... | 10 | ..... | 15 | 33 |
| 15 | Reef and Gorbatch | 429 | 19 | 9 | 17 | 474 | 90 |
| 15 | Tolstoi and Lukanin | 131 | 17 | 8 | 2 | 158 | 82 |
| 16 | Zapadni | 339 | 77 | 22 | 24 | 462 | 73 |
| 20 | Northeast Point | 487 | 132 | 29 | 26 | 674 | 72 |
| 20 | Halfway Point | 5 | ..... | ..... | 1 | 6 | 83 |
| 21 | Reef and Gorbatch | 548 | 56 | 33 | 42 | 679 | 80 |
| 21 | Tolstoi and Lukanin | 449 | 53 | 23 | 26 | 551 | 81 |
| 22 | Zapadni | 346 | 51 | 32 | 32 | 461 | 75 |
| 25 | Northeast Point | 465 | 48 | 65 | 38 | 616 | 75 |
| 25 | Halfway Point | 18 | ..... | 17 | 3 | 38 | 47 |
| 26 | Reef and Gorbatch | 664 | 139 | 30 | 78 | 911 | 72 |
| 26 | Tolstoi and Lukanin | 336 | 32 | 35 | 37 | 440 | 76 |
| 28 | Zapadni | 318 | 55 | 14 | 44 | 431 | 73 |
| 28 | Halfway Point | 12 | 1 | 2 | 1 | 16 | 75 |
| 29 | Northeast Point | 589 | 64 | 68 | 23 | 744 | 79 |
| 30 | Reef and Gorbatch | 575 | 86 | 37 | 55 | 753 | 76 |
| 30 | Tolstoi and Lukanin | 204 | 29 | 29 | 21 | 283 | 72 |
| 31 | Zapadni | 155 | 25 | 16 | 26 | 222 | 69 |
| Aug. 10 | Reef and Gorbatch | 496 | 475 | 24 | 69 | 1,064 | 46 |
| | Total | 9,179 | 1,581 | 825 | 849 | 12,434 | 73 |

CLASSIFICATION OF LARGE SEALS DISMISSED FROM DRIVES ON ST. PAUL ISLAND, SEASON OF 1910.

| Date. | Rookery. | Four years. | Five years. | Six years. | Seven years. | Adult. |
|---|---|---|---|---|---|---|
| July 4 | Reef | 7 | 9 | 9 | 6 | ..... |
| 5 | Zapadni | 12 | 6 | 11 | 2 | ..... |
| 6 | Tolstoi and Lukanin | 11 | 8 | 11 | 6 | 3 |
| 7 | Halfway Point | 1 | 2 | 6 | ..... | ..... |
| 8 | Northeast Point | 10 | 9 | 14 | 14 | ..... |
| 9 | Reef and Gorbatch | 8 | 9 | 2 | 9 | ..... |
| 9 | Tolstoi and Lukanin | 8 | 2 | ..... | 7 | ..... |
| 10 | Zapadni | 8 | 5 | 3 | 2 | ..... |
| 14 | Northeast Point | 12 | 6 | 10 | 7 | ..... |
| 14 | Polovina | 2 | 3 | ..... | 5 | ..... |
| 15 | Reef and Gorbatch | 4 | 2 | 3 | ..... | ..... |
| 15 | Tolstoi and Lukanin | 4 | 2 | ..... | 2 | ..... |
| 16 | Zapadni | 10 | 4 | 3 | 3 | 2 |
| 20 | Northeast Point | 19 | 5 | 4 | 1 | ..... |
| 20 | Halfway Point | ..... | ..... | ..... | ..... | ..... |
| 21 | Reef and Gorbatch | 2 | 9 | 12 | 10 | ..... |
| 21 | Tolstoi and Lukanin | 4 | 9 | 4 | 6 | ..... |
| 22 | Zapadni | 16 | 10 | 4 | 2 | ..... |
| 25 | Northeast Point | 24 | 21 | 18 | 2 | ..... |
| 25 | Halfway Point | 3 | 4 | 4 | 4 | 2 |
| 26 | Reef and Gorbatch | 10 | 5 | 12 | 3 | ..... |
| 26 | Tolstoi and Lukanin | 13 | 16 | 5 | 1 | ..... |
| 28 | Zapadni | 8 | 2 | ..... | 2 | 2 |
| 28 | Halfway Point | ..... | 1 | ..... | 1 | ..... |
| 29 | Northeast Point | 17 | 9 | 3 | 5 | 4 |
| 30 | Reef and Gorbatch | 14 | 16 | 4 | 1 | 2 |
| 30 | Tolstoi and Lukanin | 7 | 16 | 2 | 4 | ..... |
| 31 | Zapadni | 9 | 4 | 2 | ..... | 1 |
| Aug. 10 | Reef and Gorbatch | 12 | 1 | 2 | 6 | 3 |
| | Total | 255 | 195 | 148 | 111 | 19 |

On St. George the record of seals driven and dismissed covers the period from June 13 to July 31. In this time 3,065 seals were driven and 2,295 killed, while 240 small, 343 large, and 187 marked seals were released. The number killed represents 74 per cent of the whole number driven, an increase of 11 per cent over the killings of 1909, when 63 per cent of those driven were killed.

SEALS KILLED AND SEALS DISMISSED FROM DRIVES ON ST. GEORGE ISLAND, SEASON OF 1910.

| Date. | Rookery. | Killed. | Dismissed. | | | Tota driven. | Per cent killed. |
|---|---|---|---|---|---|---|---|
| | | | Small. | Large. | Branded. | | |
| June 13 | East | 31 | 4 | 38 | ..... | 73 | 42 |
| 23 | East and North | 138 | 11 | 93 | ..... | 242 | 57 |
| 30 | .....do | 162 | 16 | 79 | ..... | 255 | 63 |
| July 5 | East, North, and Staraya Artel | 171 | 55 | 30 | 58 | 314 | 54 |
| 12 | .....do | 313 | 26 | 14 | 21 | 374 | 83 |
| 16 | North | 258 | 18 | 5 | 5 | 286 | 90 |
| 21 | North and East | 376 | 48 | 15 | 27 | 466 | 80 |
| 26 | East, North, and Staraya Artel | 405 | 42 | 35 | 37 | 519 | 77 |
| 31 | .....do | 441 | 20 | 36 | 39 | 536 | 82 |
| | Total | 2,295 | 240 | 343 | 187 | 3,065 | 74 |

CLASSIFICATION OF LARGE SEALS DISMISSED FROM DRIVES ON ST. GEORGE ISLAND, SEASON OF 1910.

| Date. | Rookery. | Four years. | Five years. | Six years. | Seven years. |
|---|---|---|---|---|---|
| June 13 | East | 17 | 9 | 9 | 3 |
| 23 | East and North | 25 | 43 | 18 | 7 |
| 30 | .....do | 39 | 7 | 21 | 10 |
| July 5 | East, North, and Staraya Artel | 8 | 13 | 6 | 3 |
| 12 | .....do | 4 | 4 | 6 | ..... |
| 16 | North | 4 | ..... | 1 | ..... |
| 21 | North and East | 8 | 5 | ..... | 2 |
| 26 | East, North, and Staraya Artel | 13 | 6 | 11 | 5 |
| 31 | .....do | 13 | 11 | 6 | 6 |
| | Total | 131 | 98 | 78 | 36 |

It will doubtless be remarked that the percentage of seals killed in 1910 was greater than in the preceding year. The seals killed in 1910 were, however, neither larger nor smaller than those taken in 1909, but conformed at least as closely to the prescribed ages and weights as they did in 1909, the last year of the leasing system. Indeed, when doubt arose, as often it does arise, whether a seal was of the 3-year-old (or killable) age or whether it was of the 4-year-old (or prohibited) age, in 1910 the animal was allowed to escape, whereas in 1909 it would have been killed. In this respect it may be said that the killing in 1910 conformed even more closely to regulations than that of 1909.

Since the animals killed in 1910 were of the same class as those of the preceding year, and since the rejections from the drives were

fewer in proportion to those killed, it must be concluded that this condition is due not to closer killing, but to the absence, for some reason, of those animals which are not killable and which when they appear in drives make up the number of "rejected" seals. In other words, the bachelors driven were not culled more closely for killables, but fewer rejectable seals appeared in the drives, thereby making the rejection percentages smaller.

One certain reason for this increased percentage of killed in 1910 is to be found in the lessened number of "branded" or marked bachelors with which to deal during the killing. In previous years 2,000 of these marked bachelors were present during the killing season, while in 1910 only 1,000 of them were marked. Furthermore this missing thousand would have been composed of 2-year-olds which haul up on the bachelors' hauling-grounds much more frequently than do the 3-year-olds. With 1,000 2-year-olds marked for exemption from killing, it would have been certain that from 1,200 to 1,500 more rejections would have occurred during the season, the number of rejections of this class varying somewhat from year to year. On the other hand, rarely does the number of subsequent rejections of the 3-year-olds equal the number of that class actually marked.

Had 1,200 been added to the number of rejections obtained in 1910, the percentage of killed would have been 69, very nearly what it was in the year preceding.

Another presumed cause of the lack of small rejections last year is the probable fact that the smaller seals, i. e., those that had skins under 5 pounds in weight, failed to haul up on land proportionately in the same numbers as hitherto; that is to say, these small seals remained for longer periods in the water than usual. In respect to this matter we are met with the fact that we are wholly unable to state anything definite concerning the hauling habits of young bachelors. Some are always in the water and on inaccessible hauling grounds, for which reasons no definite idea of the whole number in existence can be obtained. Nevertheless, it is known that the hauling habits of seals vary from year to year; that these habits are altered by circumstances not incident to their natural environment, such as the action and movement of the pelagic fleet; that these bachelors haul in one year in greater numbers proportionately on one island than the other, or on one rookery than on other rookeries; that they return to their normal habits with the disappearance of the cause which forced them to abandon those habits temporarily.

For 1910 it can be shown that these small seals, which were yearlings the preceding year, were not killed, either as pups or yearlings. Yearlings are never killed on land except through unavoidable accident, and an analysis of London sales of skins shows that yearlings form but a small fraction of 1 per cent of the pelagic catch. Unless they

died from natural causes, of which there is no evidence, they must be in existence somewhere as 2-year-olds. Not having appeared on land during the summer, the natural inference must be that they were in the water and did not haul on land.

That there were in existence small seals which did not haul during the summer might be indicated by the fact that in the killing on August 10 the number of small seals turned away was entirely out of proportion to the usual number occurring in drives during the season. The absence of these small seals during the summer was a matter of remark, and their reappearance at the last drive of the season also was noted with interest.

In treating of this matter it is desired to show that notwithstanding the fact that of seals driven a greater percentage killed appears on the record for this year as compared with last, no smaller seals than usual were killed and not as large seals were taken as previously. The increased percentage is the result, first, of the absence of 2-year-old marked bachelors present in former years, and secondly, to a failure of young nonkillable seals to haul on land in their usual numbers during the summer.

## WEIGHTS OF SKINS TAKEN.

Of the 10,752 skins taken on St. Paul, 10,749 were weighed. Of these 70 were under 5 pounds and 48 over 8½ pounds. On St. George, 2,834 skins were weighed, of which 20 were under 5 pounds and 11 over 8½. Of the overweight skins on St. Paul, nearly all were taken in a food killing on Sea Lion Rock, and before weighing were immersed in sea water until they were saturated. In this condition each carried several pounds of water, increasing their weight correspondingly. Had they been weighed dry, or even with the usual quantity of moisture, few of them would have been above the prescribed limit.

It is not possible to avoid wetting the seals taken on Sea Lion Rock, neither is it permissible to salt the skins without weighing. It is wholly undesirable also to alter the statistics of weights in such manner as to attempt to compensate for excess due to the presence of water or other foreign substances in the fur. The weights therefore have been recorded as taken, but due allowance must be made for conditions which change the weights and which have no relation to the size of the skins.

The skins that were underweight were likewise taken mainly in food drives, at a time when the natives were eager for fresh meat and when they were restricted to killing seals having skins under 7 pounds. With the necessity of rejecting all the females and all the larger males from the food drives, it can readily be appreciated that the tendency of the natives is to let few of the small males escape, even if the skins weigh a few ounces less than 5 pounds.

On the whole it can be seen that only a few skins of the whole catch were outside the weights prescribed and that these were taken unavoidably.

WEIGHTS OF SEALSKINS TAKEN ON THE PRIBILOF ISLANDS, ALASKA, DURING THE YEAR ENDED AUGUST 10, 1910.

| Weight. | St. Paul Island.[a] | Weight. | St. George Island.[b] |
|---|---|---|---|
| *Pounds.* | | *Pounds.* | |
| 4 | 6 | 4 | 1 |
| 4¼ | 4 | 4½ | 5 |
| 4½ | 20 | 4¾ | 14 |
| 4¾ | 40 | 5 | 125 |
| 5 | 670 | 5¼ | 82 |
| 5¼ | 710 | 5½ | 406 |
| 5½ | 1,014 | 5¾ | 202 |
| 5¾ | 1,277 | 6 | 628 |
| 6 | 980 | 6¼ | 106 |
| 6¼ | 1,113 | 6½ | 524 |
| 6½ | 1,176 | 6¾ | 114 |
| 6¾ | 993 | 7 | 321 |
| 7 | 752 | 7¼ | 43 |
| 7¼ | 553 | 7½ | 168 |
| 7½ | 552 | 7¾ | 21 |
| 7¾ | 327 | 8 | 54 |
| 8 | 203 | 8¼ | 4 |
| 8¼ | 172 | 8½ | 5 |
| 8½ | 139 | 9 | 6 |
| 8¾ | 7 | 9¼ | 1 |
| 9 | 17 | 9½ | 2 |
| 9¼ | 4 | 10½ | 1 |
| 9½ | 7 | 10½ | 1 |
| 9¾ | 4 | Total | 2,834 |
| 10¼ | 1 | | |
| 10½ | 2 | | |
| 11 | 1 | | |
| 11¼ | 4 | | |
| 12 | 1 | | |
| Total | 10,749 | | |

[a] Nearly all the oversize skins listed from St. Paul Island were taken in a food killing from Sea Lion Rock, on which occasion the skins when weighed carried from 1 to 3 pounds of water each. Had they been dry when weighed, very few or none would have exceeded the prescribed weights. The major portion of skins underweight were taken in food drives for the natives, when large seals were released, and, consequently, the smaller seals were killed closely.

[b] Of the skins from St. George over or under the limit of weight only 3 were taken during the sealing season proper. Four were taken by the company last year, and withheld from the quota; the others were taken during food killings, when the natives were particularly eager for fresh meat.

Following is a statement furnished by Messrs. C. M. Lampson & Co., of the sizes of the sealskins consigned to them by the United States Government for auction in London. This statement shows the classification of the 12,920 skins as weighed and assorted upon their receipt by the firm.

ASSORTMENT OF ALASKA SALTED FUR SEALSKINS FOR ACCOUNT OF UNITED STATES GOVERNMENT, DEPARTMENT OF COMMERCE AND LABOR.

[London, 19th November, 1910, 64 Queen Street, E. C. Subject to recount.]

| | Lbs. | oz. |
|---|---|---|
| 78 smalls | 7 | 15 |
| 713 large pups | 7 | 2 |
| 3,032 middling pups | 6 | 7 |
| 4,899 small pups | 5 | 12 |
| 1,266 ex. small pups | 5 | 5 |
| 11 ex. ex. small pups | 4 | 10 |
| 33 smalls, low | 7 | 11 |
| 135 large pups, low | 6 | 9 |
| 498 middling pups, low | 6 | 1 |
| 501 small pups, low | 5 | 9 |
| 88 ex small pups, low | 5 | 0 |
| 10 smalls, cut | 7 | 2 |
| 71 large pups, cut | 6 | 13 |
| 238 middling pups, cut | 6 | 2 |
| 421 small pups, cut | 5 | 6 |
| 81 ex. small pups, cut | 4 | 15 |
| 6 smalls, rubbed | 7 | 0 |
| 55 large pups, rubbed | 6 | 14 |
| 195 middling pups, rubbed | 6 | 6 |
| 290 small pups, rubbed | 5 | 11 |
| 75 ex. small pups, rubbed | 5 | 3 |
| 36 faulty. | | |
| 12,732 | | |
| 5 smalls. | | |
| 21 large pups. | | |
| 48 middling pups. | | |
| 94 small pups. | | |
| 18 ex. small pups. | | |
| 2 faulty. | | |
| 188 | | |
| [a] 12,922 | | |

[a] See p. 15. This number recorded as shipped, but two skins afterwards found wedged under floor of boat used for lightering skins to steamer *Homer*.

## ENUMERATION OF BREEDING HERD.

### COUNTS OF HAREMS.

The usual counting of harems and idle bulls at the height of the season of 1910 disclosed the following:

COUNT OF HAREMS AND IDLE BULLS ON ST. PAUL ISLAND, 1910.

| Date. | Rookery. | Harems. | Idle bulls. | Quitters. | Water bulls. |
|---|---|---|---|---|---|
| July 12 | Lagoon | 9 | 3 | ..... | ..... |
| 12 | Tolstoi Cliffs | 29 | 5 | 1 | ..... |
| 12 | Tolstoi | 77 | 7 | 1 | 5 |
| 12 | Zapadni Reef | 7 | ..... | 3 | ..... |
| 12 | Little Zapadni | 54 | 10 | 4 | 4 |
| 13 | Kitovi | 53 | 7 | 4 | 4 |
| 13 | Amphitheater | 9 | 2 | 1 | ..... |
| 13 | Lukanin | 41 | 5 | 6 | 5 |
| 13 | Ardiguen | 11 | 1 | ..... | ..... |
| 13 | Gorbatch Cliffs | 2 | ..... | 2 | ..... |
| 13-15 | Gorbatch | 110 | 12 | 15 | ..... |
| 13-15 | Polavina | 50 | 5 | 2 | 10 |
| 13-15 | Polavina Cliffs | 20 | 5 | 5 | ..... |
| 13-15 | Little Polavina | 12 | 2 | 7 | ..... |
| 14 | North East Point | 251 | 30 | 17 | 10 |
| 15 | Reef | 206 | 28 | 4 | 13 |
| 16 | Zapadni | 118 | 22 | 9 | 4 |
| | Total | 1,059 | 144 | 81 | 55 |

The number of harems on Sea Lion Rock, which could not be visited at this season, is placed at 61, the number found last year.

COUNT OF HAREMS AND IDLE BULLS ON ST. GEORGE ISLAND, 1910.

| Date. | Rookery. | Harems. | Idle bulls. | Hauling-ground bulls. | Quitters. |
|---|---|---|---|---|---|
| July 14 | Little East | 4 | ..... | ..... | ..... |
| | East Reef | 22 | 6 | ..... | ..... |
| | East Cliffs | 37 | a 14 | ..... | ..... |
| | North | 103 | 21 | 10 | ..... |
| | Staraya Artel | 48 | 17 | 21 | ..... |
| | Zapadni | 47 | 19 | 16 | 1 |
| | Total | 261 | 77 | 47 | 1 |

a Includes hauling-ground bulls.

A summary of the number of bulls on both islands, with a comparison of the number found in 1909, follows:

SUMMARY OF BULLS ON ST. PAUL AND ST. GEORGE ISLANDS, 1910.

| | Harems. | Idle bulls. | Quitters. | Hauling-ground bulls. | Water bulls. |
|---|---|---|---|---|---|
| St. Paul | 1,059 | 144 | 81 | ..... | 55 |
| St. George | 261 | 77 | 1 | 47 | ..... |
| Sea Lion Rock | a 61 | ..... | ..... | ..... | ..... |
| Total, 1910 | 1,381 | 221 | 82 | 47 | 55 |
| Total, 1909 | 1,399 | 172 | 139 | 98 | 13 |

a Estimated.

Compared with 1909 the number of harems on both islands has decreased 18, or 1.3 per cent, an inappreciable decrease when contrasted with that which has occurred annually for years. This decrease in harems can not be laid to a scarcity of bulls, as can easily be proved, but to a lack of enough cows to provide other bulls with harems.

On the other hand the number of idle bulls—that is to say, those mature adult males stationed on rookeries waiting for cows—has been increased from 172 to 221, or a gain of 29 per cent. This is the result of the saving of young males by marking and of further restrictions upon killing, commenced in 1904.

The number of 7-year old males or "quitters," so termed because of their tendency while idle to desert their stations when approached by man, has decreased from 139 to 82; the number of water bulls has increased from 13 to 55, and of the hauling-ground bulls there has been a decrease from 98 to 47. As these latter classes are more or less unstable and as some of each class could have been in the water at the time these counts were made, it is not attempted to ascribe specific reasons for the fluctuations in them. The fact is demonstrated, however, that young bulls are present in fair numbers. The further fact that 13 per cent of the stationed bulls, excluding quitters,

are idle, indicates conclusively that the herd of breeding bulls is properly safeguarded from too close killing by existing regulations.

### COUNTS OF PUPS.

Because of the presence of Japanese schooners in numbers close to the islands, counts of pups on St. Paul Island were limited to Kitovi rookery, including Amphitheater. On St. George Island, for the same reason, pups were not counted except on Little East rookery, which now embraces only a few seals. The St. Paul counts follow:

COUNTS OF PUPS ON ST. PAUL ISLAND, 1910.

| | Live pups. | Dead pups. | Total pups. | Harems. | Average harem. |
|---|---|---|---|---|---|
| Kitovi | 1,717 | 57 | 1,774 | 53 | 33.4 |
| Amphitheater | 187 | 5 | 192 | 9 | 21.3 |
| Total, 1910 | 1,904 | 62 | 1,966 | 62 | 31.7 |
| Total, 1909 | 1,915 | 64 | 1,979 | 58 | 34.1 |

From the comparisons which the foregoing data afford, it would appear that the breeding cows on this rookery have not decreased but have remained virtually stationery as regards numbers during this period. The harems thereon, however, are more numerous, thus giving fewer cows to each bull, or, technically speaking, lowering the average harem on this space from 34.1 in 1909 to 31.7 in 1910.

On St. George the count of pups on Little East, which, as stated, was the only count of pups made on that island, disclosed 75 pups in 4 harems, or an average of 18.7 cows per harem. The great decrease in this rookery (Little East) may be appreciated when it is noted that in 1897 the seal census made by the Jordan Commission gave to this rookery 46 harems and 1,190 cows. The number found there in 1910 represents a diminution in thirteen years on this small rookery alone of 42 harems and 1,115 cows.

### NUMBER OF BREEDING COWS.

As it is highly impracticable to count the pups on all the rookeries, it has been customary to arrive at the whole number of breeding cows by estimation based upon an actual count of the whole number of harems on the islands and the average number of cows found to be in each of the harems of one rookery which is accepted as typical of all.

As the number of harems on all islands has been ascertained to be 1,381 and the average harem, as demonstrated by the count of Kitovi, to be 31.7, the whole number of breeding cows in 1910 would be 43,777. As 45,786 of such cows were shown by this method to

be present in 1909, the decrease between the years, 2,009, represents a loss of 4.3 per cent.

This for all practical purposes, is a fairly accurate measure of the number of breeding cows, which constitute the most important factor in the herd. While merely an estimate, the number is close enough to actual conditions to be approximately correct. A loss of only 4.3 per cent in the breeding cows from the pelagic sealing which has been practiced with such assiduity during 1910 would seem too small. However, the statistics of the seal herd for the last few years demonstrate that the rate of decrease during this period has not been large, and it is not out of the way to believe that it was small in 1910.

## CENSUS OF ENTIRE SEAL HERD.

Beyond the breeding cows and pups, estimates of which contain much of accuracy, an estimate of the whole herd is very difficult to make, and is unsatisfactory in that it treats of elements which are not susceptible of ascertainment and must be approximated. There are also very few means of testing its accuracy at this or a future time. The methods used are, however, the best that can be devised and tend in the direction of accuracy rather than the opposite.

### ESTIMATE OF HALF BULLS.

The record of rejections of seals from drives during the summer season of 1910 shows that 1,168 young males too large to be killed were released from the killing fields. It has been established that not by any means all of this class of animals haul in places where they can be enumerated and that the number of those actually turned away should be doubled at least to arrive at the whole number in existence.

By doubling the number found, 1,168, we would have 2,336 half bulls, from which we may look for recruits to the breeding bulls.

### ESTIMATE OF 2-YEAR-OLDS.

In 1908 it was computed that 53,884 pups were born. Being equally divided as to sex, one half, or 26,942, were males and an equal number females.

In 1909, if we allow the diminution of 50 per cent for mortality at sea, which has been taken heretofore to occur among the pups during their first migration, one-half of these would return in 1909 as yearlings. There should have been then in 1909 by this method of computation 13,471 yearling males and an equal number of females. These, with a loss of something like 10 per cent, would return in 1910 as 2-year-olds to the number of approximately 12,124 of each sex.

We should have in 1910, therefore, by this computation, over 12,000 virgin or 2-year-old cows and an equal number of males.

From the latter, however, at least 7,500 were killed during the last summer, leaving approximately 4,500 2-year-old males in existence at the close of the season. The above computation would indicate that 12,124 2-year-old cows and 4,500 2-year-old males were present at the end of the killing season of 1910.

### NUMBER OF YEARLINGS.

In 1909 it was estimated that 45,764 pups were born, half of which were males and half females. By applying a 50 per cent death rate during their initial migration we should have in 1910 11,441 yearling males and the same number of yearling females.

### NUMBER OF 3-YEAR-OLDS.

Nine hundred and fifteen 3-year-olds were marked during the summer and released as breeders. An uncertain number in addition was not driven at all and still survive. It would be a moderate allowance to estimate the number of 3-year-olds remaining in the herd at 1,200.

### SUMMARY OF SEAL LIFE IN 1910.

From the foregoing computations an approximate census of seal life present on the islands at the close of the sealing season of 1910 would be as follows:

| | |
|---|---|
| Bulls, active with harems | 1,381 |
| Bulls, idle, and quitters | 303 |
| Half bulls | 2,336 |
| 3-year-old bachelors | 1,200 |
| 2-year-old bachelors | 4,500 |
| Yearling bachelors | 11,441 |
| Male pups | 21,888 |
| Breeding cows | 43,777 |
| 2-year-old (virgin) cows | 12,124 |
| Yearling females | 11,441 |
| Female pups | 21,888 |
| Total | 132,279 |

The foregoing "census," if we except the bulls with harems, and those idle, is nothing more than an estimate based upon such enumerations as could be made that were of value in determining the number of seals. While it shows over 2,000 seals less than a similar computation in 1909, it nevertheless exhibits apparent increases in certain classes of seals over the preceding census spoken of. For example, the 2-year-old bachelors estimated to be present in 1910 exceed in numbers by over 2,000 those stated to be in existence at the close of the season of 1909. The 2-year-old cows estimated in 1910 are 2,000 more than were assigned for the previous year.

This is the result solely of the method of estimation adopted alike for both years. Both are based upon the number of cows born two years previously. In 1907, 50,825 pups were estimated to have been born, and 10,165 of these were computed to have survived as 2-year-old males in 1909. On the other hand, in 1908, the same method of estimation would indicate that 53,884 pups were born in that year—3,000 more than in 1907—and that of these the number surviving as 2-year-olds in 1910 was 12,124.

It is believed that it is not the intention of anyone to claim that an increase in seal life has occurred at any time within the past few years in the face of the large catches of seals in the water, consisting mainly of breeding females. It is believed, on the other hand, that a marked decrease has occurred, a belief justified when the contracted space occupied by the breeding seals is viewed. But the measure of this decrease is ascertainable solely by estimation, the same methods being used from year to year. When using only a few seals in establishing a basis for computing the whole number, it is not difficult to realize that a few chance harems more or less on the space counted would have the effect of greatly increasing or decreasing the whole number computed to be in the herd. It would be easy to revise these calculations by adding to or subtracting from the estimated number to make it conform with one's idea of what number should or should not be found. But the idea one may have might be more incorrect than the result of the computation, so that in a revision it would not be possible to determine whether in increasing or decreasing the result one were moving in the direction of accuracy or away from it. It is much better to announce the number each year as it may appear from calculations made similarly, and to explain any apparent incongruity by the statement that the whole is an estimate and nothing else.

The result of the killing of 1910 has demonstrated that the number of 2-year-old bachelors estimated as remaining in the herd at the close of the season of 1909 was entirely too small. In the census of 1909 only 2,165 2-year-old bachelors were allowed. These of course would be 3-year-olds in 1910. As a matter of fact, the skins of 1910 when classified in London showed that perhaps 5,000 of the catch were 3-year-olds. In view of this fact it is believed that, in estimating the number of these as well as other immature seals, a smaller death rate should be allowed than hitherto.

## PUP-RAISING EXPERIMENTS.

In accordance with the Bureau's instructions, attempts were made on both St. Paul and St. George Islands to feed starving pups and save their lives. On St. Paul Island the efforts were unsuccessful, but the St. George experiments yielded most interesting results.

### ST. PAUL EXPERIMENTS.

Perhaps a dozen or more starving pups were gathered off the various rookeries and brought to the village. An inclosure was built at the end of the village pond and the pups were placed in this.

A bottle with an ordinary rubber nipple was used in a first attempt to induce the little animals to nurse. This method failing, however, milk was poured down the pups' throats from the bottle. But this, besides being difficult and tedious, was uncertain and wasteful, as most of the milk was ejected by the pups before being swallowed. To feed a dozen or more pups with a bottle, moreover, occupied the services of half a dozen men for nearly half a day. Afterwards a tube attached to a funnel was passed into the stomach of each pup and the feeding was accomplished by this means.

Owing to lack of proper material the inclosure in which the pups were placed could not be made tight enough to retain them. Some of the pups escaped to the sea; the others died. Feeding with solid food was not attempted.

Upon the departure of the *Bear* on her last trip from the islands, 10 healthy pups upon which no feeding experiments had been attempted were taken from St. Paul rookeries and placed aboard that vessel to be shipped to Seattle for the use of the Bureau. All of these arrived safely, having been schooled on the voyage to eat solid food.

### ST. GEORGE EXPERIMENTS.

Fifteen starving pups were gathered on St. George Island at various times and different methods were tried to save their lives.

These starvelings readily ate all the small live fish that could be obtained and such other larger fish as the weather would permit the natives to capture offshore. In addition the pups ate salted salmon after it had been freshened in water. Had enough live or fresh dead fish been obtainable it is believed that at least some of the pups that were fed artificially could have been saved.

On September 10, 1910, four starving pups were secured and their frenums cut. All were fed by injections of milk into the stomach. One died that night from congestion of the lungs, probably because of the introduction into the pulmonary tract of milk while feeding. Upon autopsy of this animal, a piece of coal as large as a walnut was found lodged in the pylorus. Two of the others escaped the first night.

A corral, having a tank 4 feet by 8 feet and 1 foot deep, was then built and two more pups in addition to the one now remaining were placed in it on September 15. Into this tank filled with water were placed a number of small fish caught among the rocks (probably *Neoliparis*). The pups ate all of these at once and some sculpin cut

into small pieces. After this several attempts were made to provide sufficient fresh fish to feed the pups, but owing to rough weather only several days' supply could be obtained. After this salt salmon freshened in water was offered to the pups and eaten. When this latter was finally refused, milk and mutton broth were fed to sickly pups.

All but one of these pups, 15 in all, died on the island, and that one, after being placed aboard the *Bear*, died before reaching Seattle.

These experiments are of value, however, as demonstrating that by September 15 these pups have advanced to such a stage that they can eat and digest solid food even though they continue to nurse during October and November. The results also show, however, that on the seal islands these experiments can not be carried on with hope of success because fresh fish can not be obtained with regularity in sufficient quantity. Had these pups been taken to Unalaska, where small fish can be readily obtained, it is believed that much better results would have followed.

Of the 14 that died on St. George Island, the autopsies in 2 cases disclosed occlusion of the pylorus by stones taken through the mouth. The death of at least 1 of the pups was due to this condition.

## PELAGIC SEALING.

During the season of 1910, 25 Japanese sealing schooners were boarded by revenue-cutter vessels on patrol in Bering Sea. Of these, 2 were seized by the cutters, 1 for a violation of the alien fishing laws and another for a violation of the customs law (section 2773, Revised Statutes). As a rule pelagic sealing vessels kept outside the 3-mile limit, and, so far as known, none of the men composing the crews landed upon the islands for the purpose of killing seals.

Eleven Japanese in 3 small boats landed on St. Paul Island on July 30 and 31. It was stated by them that they had been lost from their schooners and came to the islands as a place of refuge. They were quartered on the islands until August 8, when they were placed aboard the *Manning* and taken to Unalaska with 4 native witnesses, charged with having landed upon the islands without permission, in violation of the act of April 21, 1910.

Upon trial before the United States commissioner at Unalaska they were found guilty and each sentenced to a week's imprisonment. After serving this sentence they were placed aboard a Japanese sealing schooner with their boats, guns, and other property and sent home.

Unofficial reports indicate that 5 Canadian sealing vessels took seals last year in Bering Sea. Their catch from both the Pribilof

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 84 | 82 | ..... | 1.02391 | ..... | 12′ Agz.; 3 m.b. | botm... | 21 | N. 57° W.. | 1.0 | Sounding with hand lead. |
| .... | .... | ..... | ..... | ..... | dip; e. l..... | surf.... | ..... | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 2 gill nets..... | ..... | ..... | ..... | ..... | Hauled following morning. |
| 84 | 83 | ..... | 1.02448 | ..... | 12′ Agz.; 3 m.b. | botm... | ..... | ..... | ..... | Fouled bottom; trawl lost; mud bag only recovered; sounding with hand lead. |
| .... | .... | ..... | ..... | ..... | dyn..... | 3–10 ft.. | 3 00 | ..... | ..... | Brackish water. |
| 83 | 83 | ..... | 1.02406 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 18° W.. | .7 | |
| 86 | 84 | ..... | 1.02395 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 15 | N. 16° E... | .5 | |
| 84 | 84 | ..... | 1.02483 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 27° E... | .6 | |
| 81 | 84 | ..... | 1.02493 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | S. 28° E... | .6 | Mud bag lost. |
| 81 | 84 | ..... | ..... | ..... | K2..... | surf.... | 10 | S. 28° E... | .3 | Towed alongside. |
| .... | .... | ..... | ..... | ..... | dyn..... | 12–15 ft.. | 1 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 2 gill nets..... | ..... | ..... | ..... | ..... | Finally hauled on Apr. 17. |
| .... | .... | ..... | ..... | ..... | 130′ seine..... | 6 ft..... | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 12–15 ft. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 4–20 ft.. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 8–30 ft.. | 3 00 | ..... | ..... | Coral unthrifty. |
| .... | .... | ..... | ..... | ..... | 150′ seine..... | 6 ft..... | ..... | ..... | ..... | 2 hauls. |
| .... | .... | ..... | ..... | ..... | dyn..... | 4–30 ft.. | 2 30 | ..... | ..... | 2 boats used. |
| 82 | 84 | 76.3 | 1.02406 | 1.02523 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 11 | N. 1° W... | .2 | |
| 83 | 83 | ..... | ..... | ..... | K2..... | surf.... | 11 | N. 1° W... | .2 | Towed alongside. |
| 83 | 84 | 56.6 | 1.02482 | 1.02509 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | int. 4 §..... | (?)..... | 20 10 | N. 31° W.. | 1.7 | 200 fms. dredge cable out. |
| 84 | 84 | ..... | ..... | ..... | K2..... | surf.... | 20 | N. 31° W.. | 1.7 | Towed alongside. |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–10 ft.. | 1 30 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | 150′ seine..... | ..... | 2 30 | ..... | ..... | 5 hauls. |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–10 ft.. | 3 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–10 ft.. | 1 00 | ..... | ..... | |
| .... | .... | ..... | ..... | ..... | dip; e. l..... | surf.... | ..... | ..... | ..... | |
| 82 | 80 | 59.9 | 1.02467 | 1.02476 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 83 | 80 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 21° W.. | .9 | Veered 8 fms. during haul. |
| 82 | 81 | ..... | 1.02489 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 81 | ..... | ..... | ..... | 12′ Agz.; m. b.. | botm... | 20 | N. 22° W.. | .8 | |
| .... | .... | ..... | ..... | ..... | dyn..... | 6–25 ft.. | 2 00 | ..... | ..... | |

## CONDITIONS AND TRAPPINGS ON ST. GEORGE ISLAND.

On St. George Island, during the winter of 1909–10, the feeding of foxes in the herd during the period from October 20 to June 1 was continued as in former years. Seal carcasses preserved from killings during the summer formed the greater portion of the material fed, together with about 3,000 pounds of salted codfish freshened in sea water.

For some reason, not ascertained exactly, a smaller number of foxes passed through the house and box traps during the winter in question than ever before since feeding the foxes and selective trapping began. Whether this is the result of an actual diminution in the herd, or whether other conditions, such as an abundance of food outside the traps or an instinctive fear of entering the traps, were the cause, can not be stated definitely.

During the winter of 1909–10 only 335 foxes passed through the traps on St. George Island. To show the smallness of this number as compared with former years, a table with the total number of foxes handled in the various years during which selective trapping has been followed is given below:

| | | | |
|---|---|---|---|
| 1898–99 | 842 | 1904–5 | 766 |
| 1899–1900 | 973 | 1905–6 | 1,061 |
| 1900–1901 | 1,335 | 1906–7 | 882 |
| 1901–2 | 1,104 | 1907–8 | 1,006 |
| 1902–3 | 1,011 | 1908–9 | 798 |
| 1903–4 | 1,061 | 1909–10 | 335 |

In trapping, the practice is to catch all animals alive, to release as breeders a certain number of pairs of the most vigorous, and to kill those that are not considered the best examples of the species. Those released are marked, so as to be thereafter recognizable, by clipping a ring out of the hair on the tail of the animal, the marks differing for the sexes. Such foxes as escape being trapped, not being marked of course, can be distinguished at sight.

No such number of foxes not marked was seen in the winter mentioned as to lead unquestionably to the conclusion that the herd has not diminished. There are, on the other hand, good grounds for believing that it has diminished. The causes of this probable fact, however, are obscure and conjectural. The very few found dead did not justify the belief that any epidemic had occurred.

A summary of the statistics of trapping on St. George Island during the winter of 1909–10 is appended:

| | |
|---|---|
| Marked and released: | |
| Blue males | 51 |
| Blue females | 57 |

| | |
|---|---|
| Killed for pelts: | |
| Blue males | 126 |
| Blue females | 86 |
| White males | 5 |
| White females | 4 |
| Skins from animals found dead, etc | 6 |
| Skins accepted by lessee, blue | 203 |
| Skins rejected by lessee, blue | 6 |
| Skins mangey, etc., thrown away | 9 |
| White fox skins accepted by lessee | 9 |
| Total number of animals handled | 335 |

These pelts, having been taken during the period covered by the contract of the North American Commercial Company, were delivered to it upon payment at the stipulated rate of $5 for each blue skin and $1 for each white skin. The money thus derived was used exclusively for the support of natives.

### TRAPPING ON ST. PAUL ISLAND.

During the winter of 1909–10, for the first time since 1904, there were considered to be foxes enough on St. Paul to justify trapping, which accordingly was carried on during a period of six days.

On this island, unlike St. George, notwithstanding repeated efforts to secure it, the foxes do not congregate in large groups, permitting systematic feeding and selective trapping. Any trapping therefore on St. Paul must be done with the spring steel trap, in the use of which the native trappers must scatter over the entire island.

In the 6 days of trapping mentioned the St. Paul natives secured on that island 130 blue and 35 white foxes. In addition, a boat load of native men went over to Otter Island, and there secured 19 blues and 1 white. Observations made during the past summer indicate that the fox herd on St. Paul Island has not diminished appreciably as the result of this trapping of the previous winter.

The skins taken on St. Paul and Otter Islands were delivered to the North American Commercial Company and payment made at the same rate as on St. George. This difference between the management of the two islands exists, however, that whereas the earnings on St. George from fox skins are formed into a community fund, on St. Paul each individual trapper is given the use of the money from such fox skins as he has been able to secure.

## RECOMMENDATIONS.

### KILLING OF BACHELOR SEALS.

The methods used in taking seals during the past season of 1910 were the same as those used by the two lessees in the preceding 40 years' tenure of the sealing right, and the same, in fact, in all

fundamental respects as those pursued by the Russians since 1840. They are the result of years of experience and are the best that can be devised to meet the conditions. No change in them should be made.

The practice of killing bachelor seals for skins as well as for natives' food should not be abandoned unless a cogent reason presents itself. No harm to the seal herd can result from the killing of surplus males. No benefit to the herd could accrue from the maturing of males unnecessary for purposes of reproduction, which, when of adult age, would have no female consorts, but which, by incessant and furious fighting, would destroy or cripple the breeding bulls and themselves as well.

It is true that a test to insure the survival of the fittest should be applied to the male fur seal, as in fact it should to all breeders. It is not true, however, that this test can only be made through trial of combat. With respect to some groups of animals, such as the Pinnipedia, conditions of their natural environment may be so severe as to eliminate weaklings as effectually or even more so, than would fighting amongst themselves, and nature provides an eliminative process in the case of the fur seal entirely apart from the struggling of bulls with each other for supremacy on land. This test begins almost with a seal's birth.

When the baby seal has scarcely learned to swim beyond the borders of the rookery on which it is born, while it is still a suckling and knows not how to seek other food, it is separated from its mother and driven off the land by the rigor of the climate. Weak and unskillful swimmer as the pup is, not only must it withstand the severe winter storms in the northern ocean but in the same unfavorable element pursue and capture its food and elude its natural enemies of the sea. As the result of this struggle with the natural conditions in which it is placed it is estimated that one-half of the pups die during the initial migration. Only the strongest and most wary can survive this trial.

This struggle for existence continues incessantly during the animal's life. From each migration it sends back to the breeding grounds only those animals hardy enough to withstand its severity. That animal leaving the rookeries with any physical imperfection does not return. It dies at sea. Those that do return are the most perfect examples of their class.

With this severe eliminative test occurring as the result of natural environment, to superimpose a violent struggle with his own kind after the animal has reached the breeding ground would be to subject him to further stress entirely unnecessary to prove his ability as a breeder. Having passed successfully through the winter's migration, the animal returns to the rookeries a perfect specimen of its kind. A severe trial by combat could not have the effect of increasing

its breeding efficiency, but on the other hand could only seriously impair if not wholly destroy it. It would be the same if two valuable stallions, each physically perfect, and matched in strength and courage, were allowed to fight with each other until one were killed. The survivor, if one did survive, would be so seriously injured by its opponent as to be rendered incapable of service for the time being, if not permanently.

To breed a large number of surplus male seals merely that they may fight amongst themselves and determine the strongest in combat is useless. By the time the strongest individuals have proved their superiority they have expended so much of their energy in fighting that physically weaker but fresh animals may overpower them and take their cows. Such is the history of the Pribilof rookeries during the time when thousands of idle bulls were present. Instances to substantiate this conclusion have been witnessed many times.

Since physical combat is not required to test the ability of a male fur seal, no reason is known for providing a number of males beyond that necessary to fertilize the females in the herd. Therefore the practice of killing surplus males at the time when their pelts have a considerable commercial value should be continued. Surely no purely sentimental reason should prevail over those of practical weight.

## SUPPORT OF NATIVES.

The present system of supporting the natives on the Pribilof Islands should be changed. Under it the native receives enough food, fuel, and clothing to sustain life, but only a portion of the sum necessary for his maintenance comes to him as compensation for labor performed, the remainder being donated as a gratuity through an appropriation of Congress. This latter feature is the most objectionable of all and the one which it is sought to eliminate. Better to explain the situation the following brief summary is given of the manner in which the natives have been supported since they were first transported to these islands.

In 1787, the year following the discovery of St. George Island, the discoverer, Pribilof, brought to the islands a number of native families, principally from Unalaska, and landed them there to serve as laborers in taking skins from the animals with which the islands abounded. Several other adventurers also brought natives to these islands and founded small villages at several points thereon. In 1799, upon the taking over by the Russian-American Company of the administration of the whole of Alaska, the competing traders were sent away from the Pribilofs and the islands passed under the autocratic control of Baranof. A cessation of killing was ordered, and in 1806–7 nearly all the natives were removed to Unalaska.

DREDGING AND HYDROGRAPHIC RECORDS OF THE U. S. FISHERIES

| Station No. | Position. | Chart. | Date. | Time of day. | Depth. | Character of bottom. |
|---|---|---|---|---|---|---|
| | *Pujada Bay and vicinity.* | | 1908. | | *fms.* | |
| D. 5239 | Uanivan Id. (N.), N. 78° E., 2.25 miles (6° 49′ 08″ N., 126° 15′ 12″ E.). | C. S. 4646; Jan.,1905. | May 14 | 12.44 p. m. | 171 | sft. gy. M. |
| | | | | 1.02 p. m. | 171 | sft. gy. M. |
| D. 5240 | Uanivan Id. (N.), E., 2.40 miles (6° 49′ 36″ N.,126° 15′ E.). | do. | do. | 1.33 p. m. | 145 | sft. gy. M. |
| | | | | 1.49 p. m. | 145 | sft. gy. M. |
| D. 5241 | Uanivan Id. (N.), S. 68° E., 3 miles (6° 50′ 45″ N., 126° 14′ 38″ E.). | do. | do. | 2.24 p. m. | 215 | sft. gy. M. |
| | | | | 3.05 p. m. | 215 | sft. gy. M. |
| D. 5242 | Uanivan Id. (N.), S. 56° E., 4 miles (6° 51′ 53″ N., 126° 14′ 10″ E.). | do. | do. | 3.46 p. m. | 191 | sft. gy. M. |
| | | | | 4.03 p. m. | 191 | sft. gy. M. |
| ..... | Pujada Bay (rf. S. of Tataidaga Pt.). | do. | May 15 | 9.00 a. m. | ..... | S., co. Clmps. |
| ..... | Pujada Bay (beach both sides Mati.). | do. | do. | 9.00 a. m. | ..... | Co., R., S. |
| D. 5243 | Uanivan Id. (N.), S. 66° E., 3.10 miles (6° 50′ 55″ N., 126° 14′ 35″ E.). | do. | do. | 12.54 p. m. | 218 | gy. M. |
| | | | | 1.12 p. m. | 218 | gy. M. |
| D. 5244 | Uanivan Id. (N.), S. 52° 30′ E., 4 miles (6° 52′ 05″ N., 126° 14′ 15″ E.). | do. | do. | 1.48 p. m. | 171 | gy. M. |
| | | | | 2.05 p. m. | 171 | gy. M. |
| D. 5245 | Uanivan Id. (N.), S. 41° E., 4 miles (6° 52′ 36″ N., 126° 14′ 52″ E.). | do. | do. | 2.47 p. m. | 135 | gy. M. |
| | | | | 3.02 p. m. | 135 | gy. M. |
| | *Pacific Ocean, east of Mindanao.* | | | | | |
| D. 5246 | Luban Id. (N.), S. 58° W., 4.6 miles (6° 29′ 15″ N., 126° 18′ 45″ E.). | C. S. 4724; Oct.,1909. | May 15 | 7.10 p. m. | ..... | ..... |
| | *Gulf of Davao.* | | | | | |
| ..... | Beach east of Davao town... | C. S. 4724; Oct.,1909. | May 16 | 9.00 a. m. | ..... | M., S. |
| D. 5247 | Dumalag Id. (S.), S. 78° W., 3.8 miles (7° 02′ N., 125° 38′ 45″ E.). | do. | May 18 | 8.47 a. m. | 135 | M. |
| | | | | 9.08 a. m. | 135 | M. |
| D. 5248 | Lanang Pt., S. 33° W., 0.40 mile (7° 07′ 25″ N., 125° 40′ 24″ E.). | C. S. 4648; Sept.,1907. | do. | 10.30 a. m. | 18 | Co. |
| | | | | 10.38 a. m. | 18 | Co. |
| D. 5249 | Lanang Pt., N. 1 mile (7° 06′ 06″ N., 125° 40′ 08″ E.). | do. | do. | 10.57 a. m. | 23 | Co., S. |
| | | | | 11.02 a. m. | 23 | Co., S. |
| D. 5250 | Linao Pt., N. 22° E., 1.1 miles (7° 05′ 07″ N., 125° 39′ 45″ E.). | do. | do. | 11.20 a. m. | 23 | Co., S. |
| | | | | 11.24 a. m. | 23 | Co., S. |
| D. 5251 | Linao Pt., N. 32° E., 1.1 miles (7° 05′ 12″ N., 125° 39′ 35″ E.). | do. | do. | 1.07 p. m. | 20 | Co. |
| | | | | 1.10 p. m. | 20 | Co. |
| D. 5252 | Linao Pt., N. 22° E., 1.5 miles (7° 04′ 48″ N., 125° 39′ 38″ E.). | do. | do. | 1.22 p. m. | 28 | Co. |
| | | | | 1.25 p. m. | 28 | Co. |
| D. 5253 | Linao Pt., N. 22° E., 1.5 miles (7° 04′ 48″ N., 125° 39′ 38″ E.). | do. | do. | 1.34 p. m. | 28 | Co. |
| | | | | 1.47 p. m. | 28 | Co. |
| D. 5254 | Linao Pt., N. 44° E., 0.7 mile (7° 05′ 42″ N., 125° 39′ 42″ E.). | do. | do. | 2.22 p. m. | 21 | S., Co. |
| | | | | 2.26 p. m. | 21 | S., Co. |
| D. 5255 | Dumalag Id. (S.), S. 65° W., 4.5 miles (7° 03′ N., 125° 39′ E.). | do. | do. | 6.03 p. m. | 100 | sft. M. |
| | | | | 6.13 p. m. | 100 | sft. M. |

STEAMER ALBATROSS IN THE PHILIPPINE ISLANDS, 1907–1910—Continued.

| Temperatures. | | | Density. | | Apparatus. | Trial. | | Drift. | | Remarks. |
|---|---|---|---|---|---|---|---|---|---|---|
| Air. | Surface. | Bottom. | Surface. | Bottom. | | Depth. | Duration. | Direction. | Distance. | |
| °F. | °F. | °F. | | | | | h. m. | | mi. | |
| 84 | 86 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 86 | ..... | ..... | ..... | 12′ Agz.; 3 m.b. | botm... | 7 | N. 13° W.. | 0.5 | Bridle and tripping stops carried away; net torn; frame twisted; 1 mud bag lost. |
| 84 | 86 | ..... | 1.02448 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 86 | ..... | ..... | ..... | int. 4 § | 115 fms. | 20 7 | N. 16° W.. | 1.1 | 175 fms. dredge cable out. |
| 85 | 85 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 85 | ..... | ..... | ..... | 9′ alb. Blk.; m. b. | botm... | 20 | N. 15° W.. | 1.1 | Veered from 506 to 540 fms. |
| 84 | 85 | 64.1 | 1.02457 | 1.02489 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 83.5 | 85 | ..... | ..... | ..... | 9′ alb. Blk.; m. b. | botm... | 20 | N. 13° W.. | 1.0 | |
| ..... | ..... | ..... | ..... | ..... | dyn. | 6–20 ft.. | 2 30 | ..... | ..... | |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 10 ft.... | 2 00 | ..... | ..... | 5 hauls. |
| 84 | 84 | 63.6 | 1.02453 | 1.02468 | Luc. sdr. (a)... | ..... | ..... | ..... | ..... | |
| 85 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 15° W.. | 1.1 | |
| 84 | 85 | ..... | 1.02497 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 85 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 46° E... | .7 | |
| 84 | 84 | ..... | 1.02468 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 2° W... | .8 | Net damaged. |
| 83 | 82 | ..... | 1.02477 | ..... | int. 4 § | 100 fms. | 20 8 | S. 6° E.... | 1.8 | 150 fms. dredge cable out. |
| ..... | ..... | ..... | ..... | ..... | 150′ seine..... | 6 ft..... | 2 00 | ..... | ..... | 3 hauls. |
| 80 | 83 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 81 | 83 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | N. 76° W.. | .5 | |
| 84.5 | 83 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84.5 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 4 | (?)..... | (?) | Veered from 27 to 30 fms. |
| 85 | 84 | ..... | 1.02453 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 84 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 7 | (?)..... | (?) | Veered from 30 to 36 fms. |
| 84 | 84 | ..... | 1.02457 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 84 | 84 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 3 | (?)..... | (?) | |
| 86 | 83 | ..... | 1.02433 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 86 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 5 | (?)..... | (?) | |
| 85 | 83 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 85 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 4 | S. 29° E... | .2 | |
| 83 | 84 | ..... | 1.02433 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 11 | N. 11° E.. | 1.0 | |
| 83 | 83 | ..... | 1.02417 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 83 | ..... | ..... | ..... | 6′ Jn. dr..... | botm... | 5 | N..... | .3 | |
| 83 | 84 | ..... | 1.02227 | ..... | Tnr.-Blish sdr. (e). | ..... | ..... | ..... | ..... | |
| 83 | 84 | ..... | ..... | ..... | 12′ Agz.; m. b. | botm... | 20 | (?)..... | (?) | Made after dark. |

for successful conduct of its business. The first step in that direction is to do away with the appropriation of Congress for their support and to increase the wage earned through the taking of skins to a sum at least equal to the amount necessary for their maintenance. This would at once eliminate the objectionable element of charity in the present system and allow each man to support himself and family from his own earnings. Such a course is in my opinion not only an act of simple justice, the consummation of which would, moreover, involve no additional expense to the Government, but would go far toward increasing the moral tone of the native, by making him more self-reliant and self-respecting. It can be taken without additional legislation, the Secretary of Commerce and Labor now having the power under existing law to fix the natives' compensation for taking skins.

### SCHEME OF COMPENSATION OF NATIVES.

The scheme of compensation embodied in the foregoing recommendations may be summarized as follows:

1. The appropriation for natives' support to be discontinued.
2. For natives' labor an allotment should be made of, say, $3 for each sealskin.
3. The moneys thus derived should be formed into a general fund, which should be prorated among all the natives of both islands.
4. This fund, by agreement with the natives, to be used for their support at the rate of a certain weekly amount based upon the number of mouths in each family.
5. The balance or remainder of each native's account at the close of each year to be paid to the native in cash.

It must be understood that the native is restricted by his work to the seal islands and can not go forth to pursue any other vocation, be it more or less profitable. It is not fair to this laborer to deny him all progress in the world and to confine him in his necessarily restricted sphere to such compensation only as permits the bare necessaries of life to him and his family. Whatever a corporation having a lease of the sealing privilege may have done, the United States Government ought not to put its laborer into the condition of constant and continuous vassalage with all progress denied him.

### NATIVES ON THE ALEUTIAN ARCHIPELAGO.

The Aleut race is not found on the mainland, but inhabits the Aleutian Archipelago and several of the islands along the coast of the Alaskan Peninsula. It was never numerous and now embraces probably fewer than 1,000 souls, whose numbers are decreasing rapidly from disease and insufficient food. Some action should be taken to ameliorate their condition.

When discovered by the Russians in the eighteenth century, these Aleuts were a hardy race of fishermen and aquatic hunters. In their tiny bidarkis or skin boats they made long journeys and in them successfully weathered storms that would have sent the European rowboat to the bottom. They subsisted upon fish and the flesh of such warm-blooded animals as they could capture.

Being a tractable race, except when goaded to desperation, they were at once made use of by the Russians as hunters of the sea otter, which was the fur the white men most eagerly sought. Whole fleets of bidarkis with hundreds of native hunters would be transported hundreds of miles from their homes, and thence with a little food supplied them were put to sea to buffet with the storms of the northern ocean which withal were not so greatly feared by the natives as were their white masters. Thousands of them never returned.

Aleuts in numbers were taken to Sitka by the Russians as hunters and laborers, and kept there until they died. Entire fleets of bidarki hunters were loaned by the Russian company to foreign vessels to hunt sea otter, the profits of the venture being shared equally by the vessel and the company. The ship was required to pay the Russian company about 200 Mexican dollars for every Aleut lost at sea or killed by coast Indians. In 1805, 20 bidarkis were fitted out at Kodiak and with a colony of natives were taken to San Quinten bay in Lower California, where they were required to hunt for fur seals. This colony struggled on until 1841, when it was abandoned.

In the draft of the terms upon which the Russian-American Company should receive an extension of its charter, after its expiration in 1861, or thereabouts, the following paragraph is found:

> 10. The Aleuts and other peaceful natives within the colonies are relieved from compulsory labor on behalf of the Russian-American Company. They shall be allowed to settle in localities which they may find convenient, and shall be free to absent themselves from the places of their residence, subject only to such rules of police as may be established by the board of administration of the colonies.

This clause in the proposed charter was inserted to cure abuses in respect to the treatment of natives reported by Golovnin and the creole Kashevarof. In short, the Government would renew the charter only under such terms as the company would not accept.

When the Russian-American Company acquired control of Alaska the Aleuts were paid nothing for sea-otter skins, but in lieu of compensation received subsistence and "exemption from imperial taxes and dues." When this practice was forbidden by the Emperor Alexander I and the company instructed to pay the natives for every skin deposited by them with the company the natives received for every sea otter 10 rubles in leather scrip, the equivalent of $2, but each hunter was required to furnish his own subsistence. The company sold the sea-otter skins for at least $100 each.

Upon the occupation of the territory by Americans, the native from a condition of abject misery and want was plunged into a state of affluence of which he knew not how to take advantage. Rival trading companies established stations along the coast where sea otters abounded, and bid eagerly for the furs brought in by the native hunters. But while paying him liberally for the skins, the traders adroitly exposed for sale in the stores articles of sheer luxury to tempt the native's cupidity and encourage him to expend the money received for his skins. During the seventies and eighties the Aleut sea-otter hunter clothed his women in satins and silks of the gaudiest colors; his hut contained a brussels carpet and a parlor organ; his church received large donations; in short, a great deal of his earnings was expended at once for luxuries and he was forced to hypothecate his next year's catch of skins to obtain supplies to support his family during the winter.

With the commercial disappearance of the sea otter, however, the native again relapsed into a condition of penury bordering on starvation. Whereas in the days of plenty he lived on tinned meats and luxuries from the trader's store, now to sustain life he was driven again to fish and to hunt. Having contracted the vice of drunkenness, even in his poverty he would barter his skins for rum, or for sugar and flour with which to make the Russian strong beer. Disease sapped his vitality and decimated his villages.

Such practically is the condition to-day of the native on the Aleutian chain. While formerly he had to subsist upon what he could wrest from nature, he was then as free from the vices of civilization as he is now of its saving benefits. His contact with the white race has encouraged appetites of which the native was previously ignorant and has taken away his self-reliance and ability to cope with his surroundings. In his state of poverty, the furs he is still able to gather are the object of desire of small traders, who visit his settlements annually and exchange trade goods for furs. The native has no resource but to part with his furs at such prices as the trader may wish to give.

Unless the Government takes active measures this interesting race of people will become extinct. And since the Government is trying to save species of the lower animals which are threatened with that calamity, it would seem proper that similar attention should be paid to a race of human beings which is rapidly disappearing. A simple and yet it is believed an effective plan to accomplish this end is offered and earnestly recommended to the attention of the Department:

1. The entire Archipelago to be made a special reservation. This can be accomplished without difficulty or friction. There are no vested rights in the entire range of islands, so far as known, except

at Dutch Harbor, a small portion of which has been surveyed and patented. The property of the Alaska Commercial Company at Unalaska is built on a Government reservation on which it has only squatter's rights. For its buildings it should receive compensation.

The islands in this chain are devoid of timber. Coal or minerals have appeared only in too small quantities to justify exploiting. Agriculture on any scale to support life is impossible. Grazing is impracticable. There are no good harbors except at Dutch Harbor and Unalaska. Fish are plentiful but the streams are so small that commercial fishing will not pay. In short, there exists no good reason why these islands should not be set apart for the use of those aboriginal inhabitants claiming them as their native land.

2. Trading by private persons or corporations to be prohibited.

3. The Government to maintain a station at each principal settlement, of which there are not over five. Each station to contain a store and a school, with a storekeeper and school-teacher, the whole to be under the supervision of a general agent.

4. The storekeepers should buy the natives' peltries and such other articles as they may have for sale, including baskets, at a fair price; the native should be encouraged to self-support and thrift.

5. Small fishing stations could be maintained, the product of which could be marketed for natives' account.

This plan can be worked out and operated with little trouble and expense. Without some provision of this nature the Aleuts on the Archipelago will be wiped out by disease and lack of food. With the Government willingly expending thousands of dollars to prevent extermination of the lower animals, surely no justification is needed for expenditure to prevent the extinction of a race of men who were hardy and self-reliant until brought into contact with European races.

### MANUAL TRAINING FOR NATIVES.

During the Russian occupation certain native youths exhibiting special aptitude were trained in the useful arts, such as carpentry, boat building, iron and copper working, etc.

But those natives so educated in Russian times have nearly all died, and the new generation can not build its own houses or boats. No training of this character, although greatly needed, has been provided by our Government.

Some arrangement should be made to teach the Aleuts how to work at other employments than their natural one of hunting. A teacher of the useful trades should be provided on each of the Pribilof Islands. A small school could also be established at Unalaska, and the young men from the entire archipelago sent there for a course of instruction. I recommend this to careful consideration.

## FIRE PROTECTION FOR PRIBILOF ISLANDS.

The villages of St. Paul and St. George are entirely without fire protection, and with the high winds that prevail are fortunate indeed in never having had a disastrous conflagration. Aside from the money loss entailed, such a contingency, should it occur in winter and destroy the food supply in the warehouses, would probably result in the starvation of the inhabitants. Native dwellings have been ignited by overturned kerosene lamps and in one case a whole native family while asleep was asphyxiated by fire in the interior of their house. In every case so far, however, the blaze has been discovered and extinguished before it could take serious hold upon the framework of the building.

I strongly urge the provision of adequate fire protection for both islands. The isolation of the locality demands that some means be supplied for the prevention of conflagration, which there would be a catastrophe. The investment of a small amount for this purpose would be sufficient to provide protection for years, and would be the cheapest fire insurance that could be obtained. Should these buildings burn, the business not only would be seriously interfered with, and the native and white inhabitants threatened with starvation, but the Government would lose the amount of its investment and be obliged to spend twice as much to replace the plant as was paid for it.

As to means, chemical apparatus could be used in summertime, but would be of little avail in winter because of the likelihood of freezing while not in use.

In winter, running water under pressure would be the only resort. Running water is not available at present, but could be supplied by any of the following means:

*On St. Paul.*—1. Sea water could be pumped through a small standpipe by a gasoline engine and distributed through mains in the village.

2. Fresh water from a lake a mile away could be piped to the village by pumping, and held in a large reservoir of sufficient capacity to furnish fresh water not only for fire protection but for natives' use.

3. Water from wells a half mile from the village could be pumped and used in the same manner as in suggestion 2.

*On St. George.*—1. Salt water could be pumped as in the preceding suggestion 1.

2. The water system already in use there, whereby water is brought by gravity and siphoning from a lake to the village, could be adapted to furnish a stream that would reach over any native dwelling and probably any larger warehouse or dwelling.

# THE SALMON FISHERIES OF THE PACIFIC COAST

By JOHN N. COBB
*Assistant Agent at the Salmon Fisheries of Alaska*

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Bureau of Fisheries Document No. 751

# CONTENTS.


| | Page. |
|---|---|
| Introduction | 5 |
| I. The species of salmon and the runs | 6 |
| Chinook, quinnat, or king salmon | 6 |
| Sockeye, blueback, or red salmon | 8 |
| Silver or coho salmon | 9 |
| Humpback or pink salmon | 10 |
| Dog or chum salmon | 11 |
| Steelhead trout | 11 |
| II. Fishing grounds and history of the fisheries | 12 |
| Washington | 12 |
| Columbia River | 13 |
| Oregon | 15 |
| California | 18 |
| Alaska | 21 |
| III. Apparatus and methods of the fisheries | 23 |
| Gill nets | 23 |
| Haul seines | 24 |
| Diver nets | 25 |
| Dip nets | 25 |
| Squaw nets | 25 |
| Purse seines | 26 |
| Traps, or pound nets | 27 |
| Indian traps | 29 |
| Wheels | 30 |
| Reef nets | 32 |
| Trolling | 32 |
| Bow and arrow | 34 |
| Spear and gaff | 34 |
| IV. Fishermen and other employees | 35 |
| V. Fishery regulations | 37 |
| Controversial forms of apparatus | 37 |
| Laws and their enforcement | 40 |
| VI. Methods of preparing salmon | 46 |
| Canning | 46 |
| Early days of the industry | 46 |
| Handling the salmon | 49 |
| Dressing | 50 |
| Cutting | 50 |
| Salting | 51 |
| Filling the cans | 51 |
| Washing the cans | 52 |
| Capping | 53 |
| Soldering | 53 |
| Testing | 54 |
| Cooking | 54 |

VI. Methods of preparing salmon—Continued.
Canning—Continued. Page.
Sanitary, or solderless, cans ... 55
Repairing cans ... 56
Lacquering ... 57
Labeling ... 58
Brands ... 59
Boxing or casing ... 60
Can making ... 60
Mild curing ... 60
Pickling ... 62
Dry salting ... 62
Smoking ... 63
Freezing ... 64
Miscellaneous products ... 65
Oil and fertilizer ... 66
VII. Statistics of the Pacific salmon industry for 1909 ... 68
Persons employed ... 68
Investment ... 68
Products ... 70
Products canned ... 70
Miscellaneous products ... 73
Washington ... 74
Statistics by counties ... 75
Statistics by waters ... 83
Columbia River ... 90
Oregon ... 92
Statistics by counties ... 92
Statistics by waters ... 97
California ... 105
Statistics by counties ... 108
Statistics by waters ... 112
Alaska ... 115
British Columbia ... 119
VIII. Statistical data for other years ... 121
Canning industry of Pacific coast of North America from 1864 to 1910. 121
Canning industry shown by species and waters ... 123
Pickling industry ... 136
Mild-curing industry ... 137
IX. Trade with outlying possessions ... 138
X. Foreign trade in salmon ... 140
Exports of canned salmon ... 140
Exports of fresh and cured salmon ... 149
Imports of fresh salmon ... 152
Imports of cured salmon ... 153
XI. Salmon culture ... 154
California ... 154
Oregon ... 159
Columbia River and tributaries ... 164
Washington ... 168
British Columbia ... 172
Alaska ... 174

# THE SALMON FISHERIES OF THE PACIFIC COAST

By JOHN N. COBB,
*Assistant Agent at the Salmon Fisheries of Alaska.*

## INTRODUCTION.

The most valuable commercial fisheries in the world, excepting only the oyster and herring fisheries, are those supported by the salmons. Of these the most important by far are the salmon fisheries of the Pacific coast of North America, where California, Oregon, Washington, and Alaska, including also British Columbia, possess industries representing millions of dollars of investment and millions of output annually. No published reports contain data for the entire coast, or have pertained to the same year for both Alaska and the States. In the following pages, containing the returns from a canvass occupying several months, the data are complete for the United States coast and Alaska for the year 1909, and to make the report more comprehensive, historical and geographical aspects of the subject, as well as methods of the fisheries and allied industries, are discussed at some length. Figures for British Columbia have been included also, so far as possible, the official reports of the Dominion of Canada and of the Province itself having been drawn upon for this purpose. The statistics for Alaska are taken from the already printed (1909) report of Mr. Millard C. Marsh and the present writer.[a]

[a] The fisheries of Alaska in 1909. By M. C. Marsh and J. N. Cobb, agents at the salmon fisheries of Alaska. Bureau of Fisheries Document No. 730. 1910.

## I. THE SPECIES OF SALMON AND THE RUNS.

The Pacific coast salmons are all included in the genus *Oncorhynchus*. With them the fishermen incorrectly class the steelhead trout, which really belongs to the closely related genus *Salmo*.

As long ago as 1731 the species of *Oncorhynchus* were first made known by Steller, who, almost simultaneously with Krascheninikov, another early investigator, distinguished them with perfect accuracy under their Russian vernacular names. In 1792 Walbaum adopted these vernacular names in a scientific nomenclature for these fishes.

Five species of salmon (*Oncorhynchus*) are found in the waters of the north Pacific, ranging northward from Monterey Bay on the American coast and Japan on the Asiatic, the extreme northern distribution of certain of the species having not yet been accurately determined. The five species are: (1) *Oncorhynchus tschawytscha*, quinnat, tyee, chinook, spring, or king salmon; (2) *Oncorhynchus nerka*, blueback, red, sukkegh, or sockeye salmon; (3) *Oncorhynchus kisutch*, silver, coho, or white salmon; (4) *Oncorhynchus keta*, dog or chum salmon; and (5) *Oncorhynchus gorbuscha*, humpback or pink salmon.

### CHINOOK, QUINNAT, OR KING SALMON.

The largest, best known, and most valuable of these is the chinook or king salmon (*O. tschawytscha*). It is found throughout the region from the Ventura River, Cal., to Norton Sound, Alaska, and on the Asiatic coast as far south as northern China. As knowledge extends, it will probably be recorded in the Arctic.

In the spring the body is silvery, the back, dorsal fin, and caudal fin having more or less of round black spots, and the sides of the head having a peculiar tin-colored metallic luster. In the fall the color is, in some places, black or dirty red. The fish has an average weight of about 22 pounds, but individuals weighing 70 to over 100 pounds are occasionally taken. One was caught near Klawak, Alaska, in 1909, which weighed 101 pounds without the head. The Yukon River is supposed to produce the finest examples, although this supposition is not based on very reliable observations. The southeast Alaska fish average as high as 23 pounds in certain seasons, followed by an average of about 22 pounds in the Columbia River, and about 16 pounds in the Sacramento.

In most places the flesh is of a deep salmon red, but in certain places, notably southeast Alaska, Bristol Bay, Puget Sound, and British Columbia, many of the fish, the proportion being sometimes as much as one-third of the catch, have white flesh. A few examples have been taken with one side of the body red and the other white, while some are found with mottled flesh. No reasonable explanation of this phenomenon has yet been given.

In its southern range the quinnat strikes in at Monterey Bay in sufficient numbers to justify commercial fishing about the middle of April, where it is seen feeding upon the inshore moving schools of herring and sardines, continuing until in August. There are two runs of spawning fish in the Sacramento, the first or "spring run" beginning in April and continuing throughout May and June, these fish spawning mainly in the cold tributaries of the Sacramento, such as the McCloud and Fall Rivers. The second or "fall run" occurs in August, September, and October, and these fish spawn in the riffles in the main river between Tehama and Redding, also entering the tributaries in that vicinity. The two runs merge into each other. It is also claimed that there is a third run which comes in December.

In former years the San Joaquin and the American and Feather Rivers of the Sacramento system had large runs of salmon, but excessive fishing and the operation of various mining and irrigation projects have practically depleted them.

The Eel and Mad Rivers of northern California have only a late or fall run, while the Klamath River has both a spring and a fall run, and Smith River has a spring run alone. Rogue River in Oregon has both a spring and a fall run, and the Umpqua and several other coast streams of Oregon have small early runs.

The Columbia River has three runs, the first entering during January, February, and March, and spawning mainly in the Clackamas and neighboring streams. The second, which is the best run, enters during May, June, and part of July, spawning mainly in the headwaters. The third run occurs during late July, August, September, and part of October, and spawns in the tributaries of the lower Columbia.

In Puget Sound chinook salmon are found throughout the year, although it is only during the spawning season that they are very abundant. In the Fraser River, a tributary of the Sound, the run occurs from March to August.

In the Skeena River, British Columbia, the run occurs from May to July, the same being approximately true of the Nass also.

In southeast Alaska they are found all months of the year. From March to the middle of June they are abundant and feeding in the numerous straits and sounds; in May and June the spawning fish enter the Unuk, Stikine, Taku, Chilkat, Alsek, and Copper Rivers

in large numbers, and in a few smaller streams in lesser abundance. In August, September, and October they are again to be found in large numbers feeding in the bays and sounds, while during the winter months a few have been taken on trawls set for halibut, showing that they are living in the lower depths at this time.

In Cook Inlet the run occurs during May and June and is composed wholly of red-meated fish; in the rivers of Bristol Bay the run comes in May and June, and the same is true of the Togiak, Kuskokwim, and Yukon Rivers, although fish may be seen in the upper courses of the Yukon in July, the lateness here being due to the immense distance the fish have to cover.

On the Asiatic side the chinook is found in some of the rivers of Siberia.

### SOCKEYE, BLUEBACK, OR RED SALMON.

The sockeye or blueback salmon (*O. nerka*), which forms the greatest part of the canned salmon of the world, when it first comes in from the sea is a clear bright blue above in color, silvery below. Soon after entering the river for the purpose of spawning the color of the head changes to a rich olive, the back and sides to crimson and finally to a dark blood red, and the belly to a dirty white. The maximum weight is about 12 pounds, and length 3 feet, with the average weight about 5 pounds, varying greatly, however, in different localities. Observations of Chamberlain[a] in Alaska show that the average weight of a number of sockeyes taken from Yes Bay was 8.294 pounds, while the average weight of a number from Tamgas was only 3.934 pounds. Evermann and Goldsborough[b] report as a result of the weighings of 1,390 red salmon, taken from as many different places in Alaska as possible, an average weight for the males of 7.43 pounds; for the females, 5.78 pounds; or an average weight for both sexes of 6.57 pounds. A run of small, or dwarf, males accompanies certain of the main runs, these being especially noticeable in the Chignik lagoon, Alaska, run. This species usually enters streams with accessible lakes in their courses.

A few specimens of the sockeye have been taken as far south as the Sacramento River. In Humboldt County, Cal., small runs are said to occur in Mad and Eel Rivers. Only an occasional specimen appears in the coastal streams of Oregon. The Columbia is the most southern river in which this species is known to run in any numbers, entering the river with the spring run of chinooks. From here south the species is called blueback exclusively. A considerable run enters the Quinniault River, Wash., and there is also a small run in Ozette Lake, just south of Cape Flattery.

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[a] Some observations on salmon and trout in Alaska. By F. M. Chamberlain, naturalist, U. S. Fisheries Steamer Albatross. U. S. Bureau of Fisheries Document no. 627, p. 80.

[b] The fishes of Alaska. By B. W. Evermann and E. L. Goldsborough. Bulletin Bureau of Fisheries, vol. xxvi, p. 257.

In the Puget Sound region, where it is known as the sockeye, this species ascends only the Skagit River in commercial numbers, although a small run appears in the Lake Washington system of lakes and, possibly, in the Snohomish, Stillaguamish, and Nooksack Rivers.

The greatest of all the sockeye streams is the Fraser River, British Columbia, and this stream has been famous from very early days for its enormous runs of this species, a peculiar feature of which is that there is a marked quadrennial periodicity in the run. The maximum run occurs the year following leap year, the minimum on the year following that. The greater part of the catch of the Puget Sound fishermen is made from this run as it is passing through Washington waters on its way to the Fraser. The fish strike in during July and August on the southwest coast of Vancouver Island, apparently coming from the open sea to the northwest. They pass the Straits of Juan de Fuca, Rosario, and Georgia, spending considerable time in the passage and about the mouth of the river. Small numbers run as early as May and as late as October, but the main body enters about the first week in August.

The sockeye occurs in most of the coastal streams of British Columbia, and is usually the most abundant species. The principal streams frequented are the Skeena, Rivers Inlet, Nass, Lowe Inlet, Dean Channel, Namu Harbor, Bella Coola, Smith Inlet, Alert Bay, and Alberni Canal.

In Alaska, where this fish is generally known as the red salmon, it is abundant and runs in great numbers in all suitable streams, of which, in southeast Alaska, the following are the most important: Boca de Quadra, Naha, Yes Bay, Thorne Bay, Karta Bay, Nowiskay, Peter Johnson, Hessa, Hetta, Hunter Bay, Klawak, Redfish Bay, Stikine, Taku, Chilkoot, Chilkat, Alsek, Seetuck, Ankow, etc.; in central Alaska, Copper, Knik, Kenai, Sushitna, Afognak, Karluk, Alitak, Chignik; in the Bristol Bay region, the Ugashik, Ugaguk, Naknek, Kvichak, Nushagak, and Wood. It is also supposed to occur in the Togiak, Kuskokwim, and Yukon Rivers, which debouch into Bering Sea, and probably occurs in the Arctic streams of Alaska. The run in Alaska begins usually in June and extends usually to the middle of August. It begins earlier in Prince William Sound, and sometimes extends into September in southeast Alaska.

On the Asiatic side the species is known to occur at Bering Island and in all suitable streams south to Japan, where it is found landlocked in Lake Akan, in northern Hokkaido.

### SILVER OR COHO SALMON.

The silver or coho salmon (*O. kisutch*) is silvery in spring, greenish on the upper parts, where there are a few faint black spots. In

the fall the males are mostly of a dirty red. The flesh in this species is of excellent flavor, but paler in color than the red salmon, and hence less valued for canning purposes.

This species has a maximum weight of about 30 pounds, with a general average of about 6 pounds.

The silver salmon is found as far south as Monterey Bay, where it appears during the month of July and is taken by the trollers. From Eel River, in California, north, it is found in most of the coastal streams. It usually appears in July and runs as late as November, the time of appearance and disappearance varying somewhat in different sections. Owing to its late appearance comparatively few, and they usually in the early part of the season, are packed by the canneries, most of which shut down in July and August. This fish also tarries but a short time about the mouth of the stream it is to enter, and is wary of nets, which makes it rather unprofitable to fish for the latter part of the season when it is running alone.

On the Asiatic side the coho ranges down the coast to Japan.

### HUMPBACK OR PINK SALMON.

The humpback or pink salmon (*O. gorbuscha*) is the smallest of the American species, weighing from 3 to 11 pounds, the average being about 4 pounds. In color it is bluish above, silvery below, the posterior and upper parts with many round black spots, the caudal fin always having a few large black spots, oblong in shape. The males in fall are dirty red and are very much distorted in shape, a decided hump appearing on the back, from which deformity the species acquires its name. The flesh is softer than in the other species; it is pale in color, hence its canned name, "pink" salmon.

The southern limit of the fish is the Sacramento River, but only occasional specimens are found here and in the rivers to the northward until Puget Sound is reached. Here a large run appears every other year, the only place on the coast where such is the case.

The humpback occurs in varying abundance in the waters of British Columbia, but it is in the waters of southeast Alaska that it appears in its greatest abundance. Many of the canneries in this region depend mainly upon the humpback for their season's pack, and the canned product now occupies an excellent position in the markets of the world. The fish spawn in nearly all of the small, short streams.

In central and western Alaska the runs are much smaller and the humpback is not much sought after by the cannery men, who are usually able to fill their cans with the more valuable species.

On the Asiatic side it is found in the rivers of Siberia (abundant in the Amur), but not in Japan.

In southeast Alaska the run begins in June and continues until September, or even later in some places. In western Alaska the period is somewhat shorter. In Puget Sound it continues until late in the fall.

### DOG OR CHUM SALMON.

The dog or chum salmon (*O. keta*) reaches a maximum weight of 16 pounds, the average being about 8 pounds. When it first appears along the coast it is dirty silvery, immaculate or sprinkled with small black specks, the fins dusky, the sides with faint traces of grid-ironlike bars. Later in the season the male is brick red or blackish, and its jaws are greatly distorted. Its flesh is quite pale, especially when canned, when also it is mushy in texture. It is especially good for freezing, salting, and smoking.

This species has a wide distribution. It is found as far south as San Francisco, but is not utilized commercially in California except on Eel River. It is found in most of the coastal streams from here north, being especially abundant from Puget Sound northward to southeast Alaska, both inclusive. In this region it is being utilized in greater abundance each year, as the market for it widens.

In central, western, and arctic Alaska the species occurs in varying abundance, but is utilized sparingly, except by the natives, with whom it is the favorite species dried for winter food.

This is the most abundant species of salmon in Japan, where it is called sake, and large quantities are dry-salted each year. In Siberia the species is abundant and is known as kaita or kita.

The run of dog salmon comes later than that of any other species except the coho. In Alaska it begins in June, but the height of the season does not occur until late in August or early in September, and fish are found as late as November. In Puget Sound they run from about the middle of August till late in November, and practically the same is true in the Columbia River.

### STEELHEAD TROUT.

The steelhead trout (*Salmo gairdneri*) is commonly classed as one of the salmons by the fishermen of the Pacific coast, and it has been included in this report on this account. In different localities the average weight is placed at from 8 to 15 pounds, while extreme sizes reach 45 pounds. The excellent quality of its flesh causes it to be highly prized for the fresh market, but owing to its pale color only limited quantities are canned.

The principal center of abundance of this species is the Columbia River. It is found from Carmel River, Cal., north to central Alaska, and possibly has an even wider range in Alaska. It seems to be found in the rivers during the greater part of the year. In the Columbia River the spawning season is from February to May, in Puget Sound in the spring, and in southeast Alaska in May and June. The best commercial fishing is in January, February, and March. In California the catching of this species is restricted to hook and line fishing.

## II. FISHING GROUNDS AND HISTORY OF THE FISHERIES.

### WASHINGTON.

*Puget Sound.*—Strictly speaking, the name Puget Sound should be restricted to that long, narrow arm extending south from the Strait of Juan de Fuca, but a practice has developed, and is now common among fishermen and others, of designating all the great water area in the State of Washington comprising Puget Sound proper, Strait of Juan de Fuca, Canal de Haro, Rosario Strait, the Gulf of Georgia, and the smaller straits, bays, and sounds, as Puget Sound, and this practice, for convenience sake, has been followed in this report.

This great indentation in the coast, with its numerous islands and many fine harbors, has greatly aided the development of this portion of Washington and has been especially favorable to the prosecution of the salmon and other fisheries. Numerous rivers and creeks enter the Sound, the more important of these being on the eastern shore and comprising the Nooksack, Skagit, Stillaguamish, Snohomish, Duwamish, Puyallup, and Nisqually. On the southern and western shores the tributary streams are nearly all small, the more important being the Skohomish, Quilcene, Dungeness, and Elwha.

The first fishing operations by white men were begun soon after the settlement at what is now known as Seattle, about 1852. For many years the catch was sold either fresh or salted. The first salmon cannery on Puget Sound was erected in 1877, at Mukilteo, in Snohomish County. The first pack was of 5,000 cases, composed wholly of silver or coho salmon. Later this plant put up the first humpbacks ever canned. In 1880 the cannery was removed to West Seattle. In 1885 other canneries were erected at Mukilteo, Seattle, Tacoma, and Clallam Bay, most of them packing silver and humpback salmon alone. The first sockeye salmon cannery was established at Semiahmoo, in Whatcom County, in 1892, from which time on the industry fluctuated considerably, 15 canneries being operated in 1910.

*Quillayute River.*—This is a small stream, about 30 miles in length, which flows through the southwestern part of Clallam County and empties directly into the ocean. The Quillayute Indian Reservation is located here and the natives catch some salmon and market them on Puget Sound.

*Quiniault River.*—This river, which enters the ocean in the northwestern part of Chehalis County, has a length from the ocean to Quiniault Lake of about 40 miles, wholly within the boundaries of the Quiniault Indian Reservation. Fishing is restricted to the Indians and the catch is generally shipped by rail to Hoquiam and Aberdeen, on Grays Harbor, and sold to the dealers at these places.

*Grays Harbor.*—This is the first important indentation on the coast of Washington south of Cape Flattery. It is about 40 miles long from east to west and about 20 miles wide in the widest part. The principal tributary is the Chehalis River, but there are a number of small streams which debouch into the harbor.

As early as 1878 there was a cannery on Grays Harbor, but from then until 1891 the data relating to this branch of the industry are very meager. In 1910 two canneries were in operation at Aberdeen and Hoquiam, respectively.

*Willapa Harbor.*—The entrance to this harbor, which also includes Shoalwater Bay, is about 27 miles south of Grays Harbor. The harbor runs east and west and is about 25 miles long. Shoalwater Bay extends south from it a distance of about 30 miles; its southern portion ending about a mile from the Columbia River, and on the western side being separated from the ocean by a spit varying in width from three-fourths to 1 mile. The bay is shallow, excepting in the main channel. The principal salmon streams entering the harbor are the Nasel and North Rivers, in which most of the pound or trap nets are located.

Data relating to the early history of the fisheries of this section are very meager. In 1887 there were four canneries in operation, probably the largest number ever operated. In 1910 there was but one—at South Bend.

## COLUMBIA RIVER.

The Columbia, which is the largest river of the Pacific coast, rises in British Columbia, flows through Washington, reaching the northern border of Oregon about 75 miles west of the State's eastern boundary; from this point the river forms the dividing line between Oregon and Washington, its general course being westerly. It empties into the Pacific at Cape Disappointment. Its principal tributaries are the Snake, John Day, Deschutes, and Williamette Rivers, and through these the main river drains an enormous extent of territory.

This river, which has produced more salmon than any other river in the world, has had a most interesting history. Many years before the white man saw its waters the Indians visited its banks during the annual salmon runs and caught and cured their winter's supply of food. It was about the year 1833 that a small trading sloop, under the command of Capt. Lamont, came into the Columbia

River on one of her regular trips and dropped anchor near what is now known as St. Helens. While waiting several months for a return cargo the captain salted a number of barrels of chinook salmon, using old Jamaica rum kegs for the purpose. This is the first record of the export of this toothsome fish.

In 1861, H. N. Rice and Jotham Reed began packing salted salmon in barrels at Oak Point, 60 miles below Portland. The first season's pack amounted to 600 barrels. The venture proved fairly profitable and was soon participated in by others.

In the spring of 1866 William Hume, who had assisted in starting the first salmon cannery in the United States, on the Sacramento River, in 1864, finding the run of fish in the latter stream rather disappointing, started a cannery on the Columbia at Eagle Cliff, Wash., about 40 miles above Astoria. Then the river literally swarmed with salmon, and the cannery had no trouble in packing 4,000 cases, which it increased to 18,000 the next year and to 28,000 cases in 1868. In 1867 a crude cannery on a scow was started by S. W. Aldrich, who did all the work, from fishing to canning, himself. In 1868 a cannery was built near Eagle Cliff by one of the Humes, and from this time on for a number of years the industry grew by leaps and bounds.

The banner year in the canning industry was 1884, when 620,000 cases of chinook salmon were marketed. At this time the runs were so enormous that tons and tons of salmon were thrown overboard by the fishermen because the canneries were unable to handle them.

At the present time (1910) there are 10 canneries in operation on the river, while large quantities of salmon are also frozen, mild cured, pickled, smoked, and sold fresh in the markets of the world.

Commercial fishing is carried on mainly between the mouth of the Columbia and Celilo, a distance of about 200 miles, and in the Willamette River. The most of it is in the lower part of the river, within about 40 miles of its mouth. Bakers Bay, on the Washington or north side, and just within the river's mouth, is the favorite ground for pound-net fishing. The principal gill-net drifting ground is from the river's mouth to about 20 miles above Astoria, but drifting is done wherever convenient reaches are found much farther up the river. Most of the drag seines are hauled on the sandy bars in the river near Astoria, which are uncovered at low water. Wheels are operated in the upper river above the junction of the Willamette with the main river.

Astoria is the principal center for all branches of the industry, but more especially for canning. Other places in addition to Astoria at which canneries are located are Ilwaco, Eagle Cliff, Altoona, Brookfield, Pillar Rock, Cathlamet, on the Washington shore, and at Warrendale, Rooster Rock, and Seuferts, on the Oregon shore.

## OREGON.

*Necanicum Creek.*—This short stream is in Clatsop County and enters the Pacific Ocean about 10 miles south of the Columbia River. Its fisheries are of small importance.

*Nehalem River.*—The Nehalem is a small coastal river that rises in the mountains of Clatsop and Columbia Counties, and flows into the Pacific Ocean in the northern part of Tillamook County. As early as 1887 there was a small cannery here, and the business has been followed ever since.

*Tillamook Bay and River.*—Tillamook River is a very short stream which enters Tillamook Bay, the latter being in Tillamook County and about 45 miles south of the mouth of the Columbia River.

Fishing is carried on mainly in the bay. The earliest record we have of canneries on this bay is of 1886, when two were in operation. Since 1891 but one has been operated.

*Nestucca River.*—This stream enters the ocean in the southwestern part of Tillamook County. A cannery operated here in 1887 and the business has been carried on intermittently since then.

*Siletz River.*—This river has its source in the mountains of Polk County, and enters the ocean in the northern part of Lincoln County. The commercial development of the fisheries was hampered for many years owing to the fact that the river was within the boundaries of what was then the Siletz Indian Reservation. The first cannery was established here in 1896.

*Yaquina Bay and River.*—The Yaquina ("crooked") River is about 60 miles long; its general course is nearly west through the county of Benton. The river is narrow throughout the greater part of its length. A few miles from its mouth it suddenly broadens out into an estuary from one-half to three-fourths of a mile wide which is commonly called Yaquina Bay. The river enters the Pacific about 100 miles south of the Columbia.

Salmon canning was begun on this river in 1887, when two small canneries were constructed. The next year an additional plant was erected. The business has fluctuated considerably since then and there is now but one cannery.

The fishing grounds are all in the bay and the lower section of the river. The fishermen of this section are fortunate in that they have railroad communication with the outside world, the only place on the ocean side of Oregon, except Tillamook, so situated.

*Alsea Bay and River.*—Alsea River rises in the southwestern part of Benton County, and flows in nearly a northwesterly direction to the Pacific, a distance of about 60 miles. Like the Yaquina, the "bay" is merely a broadening out of the river just inside its mouth.

The first cannery was established in 1886 and by 1888 there were three in operation. For many years past but one has been in operation.

The best fishing grounds are from the mouth of the river to about 5 miles inland.

*Siuslaw River.*—This river has its source in the mountains of Lane County, and its course lies first in a northwesterly direction and to the westward until the Pacific is reached. Through part of its course it is the dividing line between Lane and Douglas Counties.

As early as 1878 there were two canneries operated on this river, but from 1879 till 1888 there are no data available showing the extent of the fisheries. At present there are two canneries in operation.

The salmon fishing grounds extend from near the mouth of the river to about 20 miles upstream.

*Umpqua River.*—With the exception of the Columbia this is the largest and longest river in Oregon. It is formed by north and south forks, which unite about 9 miles northwest of Roseburg, and the river then flows northwestwardly and enters the Pacific. Practically all of this river is within the boundaries of Douglas County, one of the largest counties in the State. A railroad is now being built along this river and when this is completed there will doubtless be a large development of the fisheries of this region owing to the opportunities which will then be offered for shipping fresh fish.

As early as 1878 there were two canneries located on the Umpqua. The number has never been larger than this, and usually there has been but one operating. In 1910 there was but one, at Gardiner.

*Coos Bay and River.*—Coos Bay is a navigable semicircular inlet of the ocean with numerous arms or branches. There is much marshy ground in the bay, and a number of sloughs, or small creeks, which empty into the bay from both sides. Coos River proper is an unimportant stream, but a few miles in length. North Bend, Marshfield, and Empire are the principal towns on the bay. A branch railroad is being built to these points from the main line of the Southern Pacific Railway, and as soon as this is completed the fishing industry will receive a great impetus. Heretofore this region has depended upon steamers and sailing vessels plying to Portland and San Francisco for its communication with the outside world, and this slow and infrequent means of shipment has very seriously handicapped the fisheries.

Salmon canning began here in 1887, when two canneries opened for business. The business has fluctuated considerably since, most of the time but one cannery being operated, and such being the case in 1910.

Fishing is carried on mainly in the bay. A few set nets are operated in the river.

*Coquille River.*—This river is formed by three branches, called the North, Middle, and South Forks, which rise in the Umpqua Moun-

tains and unite near Myrtle Point, the head of tidewater, about 45 miles by river from the mouth of the stream. It is a deep and sluggish river, with no natural obstructions to hinder the free passage of fish. Its fisheries have been seriously hampered by the lack of railroad communication, but this will be remedied, as the railroad to Coos Bay will eventually connect with a short line now in existence between the Coquille and Coos Bay.

The principal towns on the Coquille River are Bandon, Prosper, Coquille, and Myrtle Point. Bandon is the shipping port.

Pickled salmon were cured and shipped from this river very early, the first recorded instance of any considerable quantity being in 1877, when 3,000 barrels of salmon were sent to San Francisco. The salt shipments were important until within recent years. The first salmon cannery was erected in 1883, at Parkersburg. In 1886 another was built at the same place, and the following year still another was erected close by. This was the largest number ever in operation in any one year. In 1910 two canneries were operated, both at Prosper.

The fishing grounds are from the mouth to Myrtle Point, about 45 miles inland.

*Sixes River.*—This small river is located in the northern part of Curry County, and is about 40 miles in length, entering the Pacific a very short distance above Cape Blanco. The salmon caught here are either salted or shipped fresh to the canneries on the Coquille River.

*Elk River.*—This is another small stream about 40 miles in length, which enters the Pacific just south of Cape Blanco. As on the Sixes River the salmon are either salted or sold fresh to the canneries on the Coquille River.

*Rogue River.*—This river has as its source Crater Lake in the Cascade Mountains, on the western border of Klamath County, flowing a distance of about 325 miles to the ocean, which it enters at Wedderburn. Its principal tributaries are the Illinois, Applegate, and Stewart Rivers. Owing to canyons and falls in the main river between the mouth of the Illinois River and Hellgate, the latter near Hogan Creek, which runs through the town of Merlin, navigation and fishing are impossible in that section. Except at the mouth of the river the population is very sparse until about the neighborhood of Hogan Creek, where the river approaches the railroad, and from here on for some miles there are numerous growing towns.

Owing to the fact of there being both a spring and a fall run of salmon in this river, the fisheries early became of importance, although sadly hampered because of being compelled to depend wholly on vessel communication with San Francisco, many miles away. In the early years the salmon were pickled and shipped to San Fran-

cisco. In 1877 Mr. R. D. Hume, who had been canning salmon on the Columbia River, removed to the Rogue River, and established near the mouth a cannery which he operated every season (except 1894, when the cannery burned down) until his death in November, 1908, since which date it has been operated by his heirs. Mr. Hume also operated a large cold-storage plant at Wedderburn for several years.

The development of the fisheries of the lower Rogue River was very much hampered by the monopoly which Mr. Hume acquired and maintained until his death. He bought both shores of the river for 12 miles from its mouth, and also owned an unbroken frontage on the ocean shore extending 7 miles north from the mouth of the river. As a result of this, independent fishermen could find no convenient places for landing, which was necessary in order to cure, handle, and ship the fish caught. Since Mr. Hume's death the property has been sold to various parties, but the people of Oregon, upon an initiative and referendum petition, voted in 1910 to close Rogue River to all commercial fishing.

In the upper river ranchers living along the banks have engaged in fishing for a number of years, the catch for the most part being sold fresh. In recent years, as the country has developed, this fishery has become fairly important.

*Chetco and Winchuck Rivers.*—These two unimportant streams empty into the Pacific in the lower part of Curry County, not far from the California line. The former is about 20 miles and the latter about 25 miles in length. Both have runs of salmon, and small fisheries have been maintained for some years, the catch being either pickled or sold to the California canneries.

## CALIFORNIA.

*Smith River.*—This river, which is the most northerly one in the State, rises near the Siskiyou Mountains, and runs in a westerly direction to the Pacific Ocean.

The river has only a spring run of salmon, and the early recorded history of the fisheries is fragmentary. The pickling of salmon was the main business at first and has been important ever since, as the cannery, which was first established in 1878, operated irregularly, and seems to have shut down entirely in 1895.

*Klamath River.*—This is the most important river in California north of the Sacramento. It issues from the Lower Klamath Lake in Klamath County, Oreg., and runs southwesterly across Siskiyou County, passes through the southeastern section of Del Norte County, keeping its southerly course into Humboldt County, where it forms a junction with the Trinity River, and thence its course is directed to the northwest until it reaches the Pacific Ocean.

The Klamath River is important as a salmon stream because it has both a spring and fall run of salmon. In 1888 a cannery was established at Requa, at the mouth, and this has been operated occasionally ever since. The pickling of salmon has been done here for a number of years. Some years part of the catch has been shipped fresh to the cannery on Smith River, or to the Rogue River, Oreg., cannery.

*Humboldt Bay and tributaries.*—The shore line of Humboldt County is bold and high except in the vicinity of Humboldt Bay, where it is rather flat. The latter is the only harbor along the county shore, and it is quite difficult of access, owing to the bar at the entrance, upon which the sea breaks quite heavily. The bay is about 12 miles long and about 3 miles wide. Mad River, which has its rise in the lower part of Trinity County, runs in a northwesterly direction, then makes a sharp turn and enters the bay from the north side. Eel River, which has its rise in Lake County, far to the southeast, runs in a northwesterly direction and enters the bay at its southern extremity. Small railroads running south from Eureka traverse the shores of both rivers for some miles. A railroad to run from the north side of San Francisco Bay to Eureka is now nearing completion, and when in operation it will doubtless aid very materially in extending the market for salmon caught in these rivers.

*Mattole River.*—This is a small and unimportant river in the southern part of Humboldt County, and is said to have a good run of salmon each year, but no commercial fishing has as yet been carried on here.

*Sacramento and San Joaquin Rivers.*—These two rivers are the most important rivers in California. The Sacramento is quite crooked, the distance by river from Red Bluff to San Francisco being about 375 miles, while the distance by rail between these two places is only 225 miles. The river rises in several small lakes in the mountains about 20 miles west of Sisson, in Siskiyou County, and for nearly half its length flows through a narrow canyon. The upper portion is a typical mountain stream, with innumerable pools and rapids. A little above Redding the river emerges from the canyon and widens into a broad shallow stream. Below Sacramento it runs through a level country and is affected by tides. Sloughs are numerous in this stretch, some connecting it with the San Joaquin. The Sacramento and San Joaquin Rivers join as they empty into Suisun Bay.

The principal tributaries of the Sacramento which are frequented by salmon are the Pit and McCloud Rivers and Battle Creek. At one time salmon frequented the American and Feather Rivers, but mining and irrigation operations along these streams either killed them off or drove them away.

The San Joaquin River has its source in the Sierra Nevada Mountains. Flowing westerly and forming the boundary between Fresno and Madera Counties for a considerable distance, it then turns abruptly to the north just where it is joined by Fresno Slough, which drains Lake Tulare. From here its general course is northwesterly until it joins the Sacramento River, near the latter's mouth. The Chouchilla and Fresno Rivers are the principal tributaries of the San Joaquin.

The principal fishing grounds for salmon are Suisun Bay, the lower part of San Joaquin River, and the Sacramento River as high as the vicinity of Sacramento. Drift gill nets are used almost exclusively in this section. From Sacramento to Anderson there is considerable commercial fishing, more particularly with haul seines.

Owing to the early and excellent railroad facilities which the fisheries of the Sacramento River have enjoyed, they have not been handicapped so seriously as most of the other Pacific coast rivers in finding profitable outlets for the catch. Soon after the first transcontinental line was opened the shipping of fresh salmon to eastern points began and it has been an important feature of the industry ever since.

The chief event in the history of the salmon fisheries of this river is the fact that the canning of salmon on the Pacific coast had its inception here in 1864. The circumstances leading up to this event and its consummation are interestingly told by Mr. R. D. Hume in the following words:

The first salmon cannery of the United States was located at Washington, Yolo County, Cal. A part of the building was originally a cabin situated on the river bank outside of the levee just opposite the foot of K Street, Sacramento city. It was built in 1852 and occupied by James Booker, Percy Woodsom, and William Hume. William Hume came to California in the spring of 1852, bringing with him a salmon gill net, which he had made before leaving his home at Augusta, Me. In company with James Booker and Percy Woodsom, Mr. Hume began fishing for salmon in the Sacramento River just in front of the city of Sacramento. William Hume had been salmon fishing in the Kennebec River in the State of Maine with his father, where his father and grandfather had been engaged in the same business since 1780, and their ancestors in Scotland had for pleasure pursued the sportive salmon on the Tweed and Tay for centuries before. In 1856 William Hume went back to Maine, and on his return to California the same year was accompanied by his brothers, John and G. W. Hume, who also engaged in salmon fishing in the Sacramento River. Among the schoolmates of G. W. Hume was one Andrew S. Hapgood, who had learned the tinsmith's trade, and who a short time after G. W. Hume left for California went to Boston and entered the employ of J. B. Hamblen, a pioneer in the canning business, and was sent by him to Fox Island on the coast of Maine, to engage in canning lobsters. The canning of lobster was a new and growing industry, and Mr. Hamblen, to increase his business, a short time after sent Mr. Hapgood to the Bay of Chaleur, an arm of the sea which divides the Province of Quebec from that of New Brunswick,

where, in addition to the canning of lobster, they also canned a few salmon. I believe this was the first salmon canned on the American Continent, and I am informed that the business in a small way is still carried on in that section of the country. In 1863 G. W. Hume went back to Maine, and while there visited Mr. Hapgood at Fox Island, to which place he had been again sent by Mr. J. B. Hamblen to take charge of the works at that place. During the visit of Mr. G. W. Hume to his friend Hapgood a talk about salmon was had, and it was agreed that if salmon on the Pacific coast were as plentiful as represented by Mr. Hume much money could be made in a salmon-cannery business. The plan decided on was that Mr. G. W. Hume, on his return to California, should try and induce his brother William to engage in the business with them, and, if he succeeded in so doing, Mr. Hapgood should purchase the necessary machinery and come out to California in time for the spring season of 1864. Mr. William Hume being agreeable to take part in the enterprise, Mr. Hapgood set out on the journey and arrived at San Francisco on March 23, 1864, and a few days later at the location where the operations were afterwards conducted.[a]

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For a considerable time after the salmon-canning business was inaugurated the packers suspended operations in the early part of July of each year, as at that time the market would take only goods which showed a rich oil and the best food values.[b]

The business languished after the firm established its cannery on the Columbia River, but in 1874 was renewed again by others and continued with varying success until 1905, when it ceased, owing to the smaller quantity of fish available and the difficulty of competing with the mild-cure packers and the fresh-fish dealers.

*Monterey Bay.*—The first harbor south of San Francisco is Monterey Bay, a large indentation cutting into Santa Cruz and Monterey Counties. Only a portion of it is well sheltered, however. For a number of years it had been known that salmon frequented the waters of this bay for the purpose of feeding on the young fishes which swarmed there. Sportsmen frequently caught them with rod and reel, but it was not until the early eighties that the industry was established on a commercial basis. It has since grown very rapidly. The catch has either been mild cured at Monterey or shipped fresh.

## ALASKA.

Alaska is the most favored salmon-fishing region. Many rivers, some of great length and draining enormous areas, intersect the district in every direction, while the number of small creeks is countless. Almost every one of these have runs of salmon of varying abundance. The principal streams entering Bering Sea are the Yukon, Kuskokwim, Togiak, Nushagak, Kvichak, Naknek, Ugaguk, and Ugashik; in central Alaska the Chignik, Karluk, Alitak, Sushitna, and Copper

[a] The description of the machinery used and the methods of canning have been quoted in full under "Canning" elsewhere in this report.

[b] The first salmon cannery. By R. D. Hume. Pacific Fisherman, Seattle, Wash., vol. II, no. 1, January, 1904, p. 19–21.

Rivers are the main streams, while in southeast Alaska are found, among many others, the Anklow, Seetuck, Alsek, Chilkat, Chilkoot, Taku, Stikine, and Unuk Rivers. Most of the fishing in Alaska is carried on in the bays into which these rivers debouch. In southeast Alaska, which is composed largely of islands, the fishing is carried on mainly in the bays, sounds, and straits among these.

Even before the purchase of the District from Russia in 1867 our fishermen occasionally resorted to southeast Alaska and prepared salted salmon. The salmon fisheries did not become important, however, until canning was begun. The first two canneries in the District were built in the spring of 1878, both being located in southeast Alaska. One was built by the Cutting Packing Co. at the Redoubt, Old Sitka, on Baranof Island, while the other was constructed at Klawak, on Prince of Wales Island, by the North Pacific Trading & Packing Co., which latter company still operates at the same place.

The first cannery in central Alaska was built by Smith & Hirsch at Karluk, on Kodiak Island; in western Alaska the first was constructed on Nushagak Bay in 1884 by the Arctic Packing Co.

Owing to the increased demand for canned salmon and the inability of the coast States canneries to keep pace with it, the number of canneries in Alaska rapidly increased for some years until in 1890, when there were 38 in operation. The inevitable happened about this time, however, the production having far outstripped the demand, and canned salmon became a drug on the market.

Heretofore each cannery had operated without regard to the others, but with this condition of affairs prevailing it was soon perceived that steps to reduce the output would have to be taken, and a number of the companies pooled their packs, reduced the number of plants operated, and thus cut down the output nearly one-half. The first arrangement was only temporary, but in 1893 a number of the companies combined permanently and formed the Alaska Packers' Association, which was then, and is yet, the largest company operating in the District.

Since 1893 the industry has experienced periods of alternate prosperity and adversity. In 1910 there were in operation 23 canneries in southeast Alaska, 10 in central Alaska, and 19 in western Alaska, a total of 52. The high prices realized for salmon in 1910 have drawn more capital into the industry, and in 1911 13 new canneries will be constructed and operated.

## III. APPARATUS AND METHODS OF THE FISHERY.

### GILL NETS.

The gill net is the oldest and most popular form of apparatus in use in the salmon fisheries of the Pacific coast. There are two kinds, drift and set, these names clearly expressing the difference between them. Fine flax or linen twine is generally used in their manufacture, although in some places cotton twine is employed, and it has usually 12 threads and is laid slack. They are hung in the ordinary manner—to a rope with cork floats to support the upper portion of the gear, and to a line with lead sinkers attached, which keeps the net vertical in the water and all its meshes properly distended. The nets are tanned, usually several times each season.

Drift nets vary greatly in length and depth, depending upon the width of the fishing channels, the depth of water, etc. On the Sacramento River they average about 300 fathoms in length, are 45 meshes deep, and have a stretch mesh of from 7½ to 9½ inches. On the coastal rivers of Oregon these nets average about 125 fathoms in length, and are about 36 meshes in depth, the mesh varying with the species of salmon sought. On the Columbia River the nets average about 250 fathoms in length and have a stretch mesh for chinooks of 9 to 9½ inches. On the Willamette River, the principal tributary of the Columbia, they average about 75 fathoms in length, with meshes of 8 and 9½ inches. On Willapa Harbor drift gill nets run from 100 to 250 fathoms in length, are 30 meshes deep, with stretch meshes of 7 and 8½ inches. On Grays Harbor they average 100 fathoms in length, the chinook nets run from 24 to 45 meshes in depth, with a stretch mesh of 9 inches, while the silver or coho nets are 35 meshes in depth, with a stretch mesh of 7 inches. In the Puget Sound region the nets average 300 fathoms in length, with meshes suitable for the particular species sought. In Alaskan waters the nets vary greatly in length and depth, depending upon the places where fished.

Drift gill netting is prosecuted chiefly in the estuaries of the rivers in and near the channels. If the water is clear the nets are set only at night, but should the water be muddy or discolored with glacial silt, fishing can be carried on either night or day. Night fishing is most common in the States, while day fishing is most common

in Alaska. When fishing in rivers it is necessary to work in a straight stretch of water of fairly uniform depth and free from snags or sharp ledges, these being called "reaches."

In setting the net the boat puller rows slowly across the stream while the other man pays out the apparatus, to the first end of which a buoy has been attached. When about two-thirds of the gear is out the boat is turned downstream at nearly right angles to her former course, so that the net, when set, approximates the shape of the letter L. The net is laid out at nearly right angles or diagonally to the river's course, so that it will intercept the salmon that are running in, and is usually put out about an hour before high water slack and taken in about an hour after the turn of the tide. In Alaska the fishermen usually fish on both the high and low slack. The nets are allowed to drift for the time specified, the fishermen drifting along at one end, then the net is hauled into the boat over a wooden roller fixed in the stern, and the fish, which have become gilled in the meshes, are removed and thrown into the bottom of the boat.

Set gill nets are made in the same way as drift nets, in many instances being fragments of the latter, and are usually operated in the upper reaches of the rivers. They vary in length from 10 to 100 fathoms, from 35 to 65 meshes in depth, and have the same sizes of meshes as the drift nets, the size varying, of course, with the species sought for. Sometimes these nets are staked, sometimes anchored, while occasionally only one end is tied to the shore or a stake set in the water.

On the flats off the mouth of the Stikine River, in southeast Alaska, a combination of the drift and set method is followed. A double set of stakes, about 6 feet apart, are set out from the shore for a distance of several hundred yards. An hour or two before slack water the fishermen pay out the net parallel to the line of stakes and about 50 feet from them. The tide drifts the net down until it is caught against the stakes, which retain it until slack water, when the fisherman takes it up and repeats from the opposite direction on the next turn of the tide.

### HAUL SEINES.

On the Columbia River, where this form of apparatus plays a prominent part in the fisheries, the nets vary in length from 100 to 400 fathoms; the shallowest end is from 35 to 40 meshes deep, but it rapidly increases in width and is from 120 to 140 meshes deep at the other wing. The "bunt," or bag, in the central part of the net is about 50 fathoms long. These nets are usually hauled on the numerous sand bars which are a very noticeable feature of the river at low tide. Buildings are erected on piles on these sand flats, in which the

men and horses take refuge at high tide, when the bars are covered with water. Operations begin as soon as the beach or bar uncovers, so that the men can wade about. The net is placed in a large seine boat, with the shore end attached to a dory. At the signal the seine boat is headed offshore, while the dory heads toward the bar. As the seine boat circles around against the current the net is paid out in the shape of a semicircle. The dory men hurry to the bar with the shore end of the net, the idea being to get that in as soon as possible in order to prevent the escape of the salmon in that direction. As soon as this has been accomplished, the outer shore line is brought to the bar, when several horses are hitched to the line and begin to haul in the net, care being taken by the men to work it against the current as much as practicable, and to get it in as speedily as they can in order to prevent the escape of salmon either by jumping over the cork line or finding some outlet below the footrope or lead line.

The only other place on the coast where haul seines are important is at Karluk, on Kadiak Island, in Alaska. Here the seines are hauled upon the narrow sand pit dividing the lagoon from the strait, and practically the same method is followed as in the Columbia River.

### DIVER NETS.

These are in use in the Columbia River, mainly throughout the middle and upper portions of the river. They vary from 100 to 200 fathoms in length and are used almost exclusively for chinook salmon. In construction they somewhat resemble a trammel net. Two nets are attached together side by side. The outer one, or the one toward the oncoming fish, has a larger mesh than the other, so that if the fish manages to pass through the first, it will be caught in the smaller meshes of the second.

### DIP NETS.

These consist of an iron hoop secured to the end of a stout pole with a bag-shaped net fastened to the hoop. They are generally used at the cascades on the rivers, small platforms being erected upon which the operator stands while fishing. Indians formerly used them to a large extent, but, owing to the steady decline in the number of Indians, and the appropriation of favorable spots by the whites for other forms of apparatus, they are but little used now.

### SQUAW NETS.

This type is virtually a set net. It consists of an oblong sheet of gill netting, about 12 feet long and 8 feet deep, its lower edge weighted to keep it down, and its upper edge attached to a pole that floats at the surface, and is held by a line or lines to another projecting pole which is securely fastened to the shore, so that it will not

swing around with the strain of the swift current on the net. A single block is attached to the pole, and through this passes a rope, thus making a tackle for the more convenient manipulation of the net. The dip-net fishermen of the Columbia River use this net, which derives its name from the fact that it used to be commonly operated by Indian squaws for taking salmon. But few are now in use, for the same reasons as given for the decline in the use of dip nets.

### PURSE SEINES.

This form of apparatus is in quite general use in Puget Sound and southeast Alaska, and has proved highly effective in these deep, swift waters. These seines are about 200 fathoms long, 25 fathoms in the bunt, and 20 fathoms in the wings, all with a 3-inch mesh. The foot line is heavily leaded and the bridles are about 10 feet long. The purse line is made of 1½-inch hemp. The rings through which the purse line is rove measure about 5 inches in diameter and are made of galvanized iron.

On Puget Sound the purse seiners congregate mainly on what are known as the Salmon Banks, off the lower end of San Juan Island, during the run of sockeyes. After this run is over they go up the Sound and fish for dogs and cohos, and later go to the head of the Sound and fish for dogs, cohos, chinooks, and steelhead trout. In southeast Alaska they follow the fish all over the bays, straits, and sounds of that section. Purse seines are used in a few other places, but the fishery is secondary to those with other forms of apparatus.

On Puget Sound special power boats, which are fitted with a power winch for hauling in the net, are used almost exclusively in operating the purse seines. As soon as a school of fish is sighted one end of the seine is attached to a dory, and while this remains stationary the seine boat starts off, the crew paying out the net over a roller in the stern. A circle is made around the fish, the boat returning to the dory. The purse line is then attached to the winch, and the line slowly hauled in by power. As the net comes in, the slack is neatly coiled up on a platform in the stern of the boat, the cork line lying on one side and the lead line on the other. As the circle gradually narrows a man stands at the davit with a long pole which he continually plunges into the circle and between the purse lines for the purpose of frightening the fish away from the center of the net, which is open for about a third of the time required to purse it. The poleman in time becomes very expert and is able to plunge the pole into almost any part of the center and have it return unaided to his hands. After the net has been pursed, the bag is either rolled into the boat or the fish dipped or gaffed from the net into the boat.

This style of fishing is said to have been introduced on Puget Sound by the Chinese in 1886.

## TRAPS OR POUND NETS.

A trap is stationary and consists of webbing, or part webbing and part wire netting, held in place and position by driven piles. This piling usually is held together above water by a continuous line of wood stringers, also used to fasten webbing to or to walk on if necessary.

In building, the "lead" is first constructed. This runs at right angles, or very nearly so, to the shore, and consists of a straight line of stakes, to which wire or net webbing is hung from top of high water, or a little higher, to the bottom, making a straight, solid wall.

At a little distance inshore of the outer end of the lead begin what are called the "hearts." These are V-shaped and turned toward the lead, beginning at a distance of 30 to 40 feet on either side of same and running in the same general direction, the "big heart" or outer heart first, the inner heart, supplementing the first, being smaller, and the end of the outer heart leading into it. The narrow end of the inner heart leads into the "pot" and forms what is known as the "tunnel." The tunnel ends in a long and narrow opening, running up and down the long way, and is held in position by ropes and rods. Below this is what is known as the "apron," a sheet of web stretched from the bottom of the heart upward to the "pot," in order to lead the fish into the tunnel when swimming low in the water, and to obviate the necessity of building the pot clear to the bottom, which would be expensive, as the pots of the traps are usually in quite deep water.

Some traps have "jiggers" (a hook-shaped extension of the outer heart) on each side, which help to turn the fish in the required direction.

The "pot" is placed at right angles with the inner heart and immediately adjoining same. It is a square compartment, with web walls and bottom connected in the shape of a large square sack, fastened to piling on all sides. This pot is hauled up and down by means of ropes and tackles, either by hand or, as is most popular, by steam.

The "spiller" is another square compartment adjoining either end of the pot (sometimes there are two "spillers," one at each end), and is simply a container for fish. A small tunnel leads the fish from the pot into the spiller, from whence the fishermen lift them out. This is accomplished by closing the tunnel from the pot, after which the ropes holding the front of the spiller are loosened and the net wall allowed to drop almost to the level of the water. A steam tug then pushes a scow alongside the spiller and takes position on the outside of this scow. From the deck of the tug a derrick is rigged with a running line from the steam capstan through the block at the top of the derrick. This line is attached

to the far end of a net apron, called a "brailer," which is heavily weighted by having chains along each side and leaded crossways at several places. A small boat is run inside the spiller, and the men in this draw the brailer across the barge and let it sink in the spiller. The fish soon gather over it, when the steam capstan quickly reels it in, the net folding over as drawn in from its far side and spilling the fish out on the scow. Men on the scow pick out and throw overboard the undesirable fish. The apron is then drawn back across the pot and the operation repeated so long as any fish remain. In this manner a trap with many tons of salmon in it is quickly emptied.

Traps, like nearly all other fixed fishing appliances, are built on the theory that salmon, like most other fishes, have a tendency to follow a given course in the water, whether a natural shore line or an artificial obstruction resembling one; also that the fish very seldom turns in its own wake. The trap has taken advantage of these natural tendencies of the fish, and is arranged so that, although the salmon may turn, he will continually be led by the wall of net toward and into the trap.

If a trap is located in a place where fish play and where an eddy exists, and the fish run one way with the incoming tide and the opposite with the outgoing, it will fish from both directions; if located where the fish simply pass by, as, for instance, on a point or reef, it will fish from one side only.

A variation of the trap, to be used in places where piles can not be driven, is the floating trap. An experimental trap of this variety was used at Uganuk, on Kodiak Island, Alaska, as early as 1896. Its use was abandoned in 1897, not to be resumed until some years later. A number of floating traps (of the type invented by Mr. J. R. Heckman, of Ketchikan, Alaska) have been and are being used in southeast Alaska, the first having been installed in 1907. The design of this trap follows the shape of an ordinary Puget Sound driven trap. It is constructed of logs, 20 to 26 inches at the butt, bolted and braced together in one solid frame. Suspended from this frame through the logs are 2½-inch pipes extending down in the water 30 feet. Halfway down these pipes and also on the extreme lower ends are eyebolts, to which the web is drawn down and fastened. Thus the web is kept in place as well as if the pipes were driven piles. The lead is also a continuation of large piles or logs bolted firmly together with similarly suspended pipes and webbing.

The so-called wooden traps on the Columbia River are essentially weirs, being a modification of the brush weirs or traps used by the Indians for the capture of salmon long before the advent of the white men. They are built on shore, of piling and planks, the latter arranged like slats with spaces between. The bowl, or pot, is

provided with a movable trapdoor that can be opened during the closed season and on Sundays, so that the fish can pass through and run upstream. These weirs, after being built, are launched into the river, placed in proper position near the shore, and then ballasted so that they sink to the bottom.

According to Collins,[a] "pound nets were introduced on the Columbia River in 1879. In May of that year Mr. O. P. Graham, formerly of Green Bay, Wis., built a pound net on the river similar to those used on the Great Lakes. The success of this venture led to the employment of more apparatus of this kind, and many fishermen went West to participate in the fishery."

According to the same authority[b] Mr. H. B. Kirby, who had previously fished on the Great Lakes, set a pound net in Puget Sound about 1883, but it was a complete failure. On March 15, 1888, he again set a pound net, which he had designed to meet the new conditions, at Birch Bay Head, in the Gulf of Georgia. It proved a complete success, and was the forerunner of the present large number which are set annually in these waters.

In Alaska the first trap was set in Cook Inlet about 1885. British Columbia refused to permit the use of pound nets in its waters until 1904, when their use was allowed within certain limited regions.

Some of these trap nets, especially on Puget Sound, have proved extremely valuable. The years 1898 and 1899 covered practically the high-water mark, as several desirable locations changed hands in those years at prices ranging from $20,000 to $90,000 for single pounds, the original expense of which did not exceed $5,000. But few have brought such high prices since, however, owing to the decline in the run of salmon.

The location of sites for these nets is regulated by law in Oregon, Washington, and British Columbia, but in Alaska the procedure is not well defined and has proved rather confusing to strangers. Some acquire the necessary shore line by mineral location or by the use of scrip, while still others have merely a squatter's right. Within the bounds of the forest reserve no land can be acquired except by lease, which may be secured from the United States forestry agent, Ketchikan, Alaska.

### INDIAN TRAPS.

The natives, especially in Alaska, have various ingenious methods of catching salmon. In the Bering Sea rivers they catch them by means of wickerwork traps, made somewhat after the general style of a fyke net. These are composed of a series of cylindrical and conical baskets, fitting into each other, with a small opening in the

[a] Report on the fisheries of the Pacific Coast of the United States, by J. W. Collins, Report of Commissioner of Fish and Fisheries for 1888, p. 210. 1891.

[b] Ibid., p. 257.

end connecting one with the other and the series terminating in a tube with a removable bottom, through which the captive fish are extracted. Some of the baskets are from 15 to 25 feet in length and are secured with stakes driven into the river bottom, while the leader, composed of square sections of wickerwork, is held in place by stakes.

During the summer of 1910 the author found and destroyed an ingenious native trap set in Tamgas stream, Annette Island, southeast Alaska. This stream is a short and narrow one, draining a lake, about midway of which are a succession of cascades. In the narrowest part of the latter, and in the part up which the fish swim, a rack had been constructed of poles driven into the bottom and covered with wire netting, so as almost wholly to prevent salmon from passing up. Just below, and running parallel to the rack and at right angles to the shore, was placed a box flume with a flaring mouth at the outer end. At the shore end the flume turned sharply at right angles and discharged into a square box with slat bottom and covered over with boughs. The fish in ascending the stream would be stopped by the rack and in swimming around many of them would be carried by the current into and down the flume, eventually landing in the receiving box alongside the shore.

## WHEELS.

Fish wheels are of two kinds, the floating or scow wheel, which can be moved from point to point if need be, and the shore wheel, which is a fixed apparatus. They operate in exactly the same manner, however. The stationary wheel is located along the shore in a place where experience has shown that the salmon pass. Here an abutment is built of wood and stone, high enough to protect it from an ordinary rise in the river. To this is attached the necessary framework for holding the wheel. The latter is composed of three large scoop-shaped dip nets made of galvanized-iron wire netting with a mesh of 3½ to 4 inches. These nets are the buckets of the wheel, and they are so arranged on a horizontal axis that the wheel is kept in constant motion by the current, and thus picks up any fish which come within its sweep. The nets are fixed at such an angle that as they revolve their contents fall into a box chute through which the fish slide into a large bin on the shore. The wheels range in size from 9 to 32 feet in diameter and from 5 to 15 feet in width, and cost from $1,500 to $8,000, the average being about $4,000. A number of them have long leaders of piling running out into the river, which aid in leading the salmon into the range of the wheel.

The scow wheel consists of a large square-ended scow that is usually decked at one end and open at the other. Several stanchions, some 8 to 10 feet high, support a framework upon which an awning

is spread to protect the fish from the sun's rays and the crew from the elements. To one end of the scow are fastened two upright posts, which are guyed by wooden supports, while projecting from the same end is the framework which supports the wheel, the latter being constructed in the same way, but on a smaller scale, than the stationary wheel. In operation the scow is anchored with the wheel end pointing downstream, and as the wheel is revolved by the current the fish caught fall from the net into a box-chute, through which they slide into the scow. As stationary wheels can be used only at certain stages of water, the scow wheel is a necessary substitute to be used at such times as the former can not be operated.

The above forms of wheels are used exclusively on the Columbia River.

An ingenious device is used by some of the wheelmen on the Columbia River in getting their catch to the canneries, a few miles farther down the river. The salmon are tied together in bunches and these attached to air-tight casks and sent down the stream. At the canneries small balconies have been constructed at the water end of the building. A man armed with a pair of field glasses is stationed here, and as soon as he sights one of these casks he notifies a boatman, who goes out and tows in the cask and salmon. About 800 pounds of salmon are attached to a keg, and a tag showing the wheel from which shipped is tied to the fish.

In 1908 the first fish wheel to be located in the coastal waters of Alaska was operated in the Taku River, in southeast Alaska. The wheel was set between two 4-foot scows, stationed parallel to each other, and each 40 feet in length. The wheel had two dips, each 22 feet in width and hung with netting. It could be moved from place to place, the same as the scow wheels on the Columbia River. It was operated throughout the king and red salmon runs, but caught almost no salmon, and was not set in the succeeding years.

For many years the natives of the interior of Alaska have been resorting to the banks of the Yukon River and its tributaries in order to secure a sufficient supply of salmon to sustain them through the succeeding winter. The favorite apparatus of these natives is a type of fish wheel of local invention, which has been in use by them for many years, probably long before the white man first saw the Yukon. A square framework of timbers is constructed in the water and moored to the bank by ropes. A wheel, composed of three dips, is placed in this, the axle resting upon the framework. The shape of the dip is such that the salmon caught roll off it into a trough, down which they slide into a boat moored between the wheel and the shore. Although crude in construction, it is very effective and a large number of them are set each season.

The Columbia River fish wheel is a patented device. It was first used by the patentees, Messrs. S. W. Williams & Brother, in 1879, and for several years they retained a monopoly in its use. A number are now operating on the river. The device was not new even when patented, as the natives of the Yukon River Basin had been using a precisely similar principle for an unknown number of years previously, while a similar "fishing machine," as it is called, had been in use prior to this time and is still used by white fishermen on the Roanoke River, in North Carolina.

### REEF NETS.

As the name indicates, this device is used around the reefs. Under natural conditions the reef is covered with kelp throughout its length, the kelp floating at the top of the water. A channel is cut through this, and in it is placed a tunnel of rope and netting, which flares at the outer end, in deep water, and into which is thatched grass, kelp leaves, or any other article resembling submarine growth, to hide the construction sufficiently to avoid frightening the fish. Short leads of kelp are also arranged on the sides so as to draw the fish to the tunnel, which is held in place by anchors. On the reef itself two boats are anchored parallel to each other and some feet apart. An apron of netting is fastened to the rear of the two boats, while the other end extends under the small end of the tunnel and is kept in place by men in the forward ends of the boats, who have lines fastened so the apron can be raised by them. The device can only be used with the tide entering the tunnel at the large end. When the fish have entered and passed through the tunnel upon the apron, the men raise the floating end of the latter and dump them into the boats.

At one time this was a favorite device of the Puget Sound natives for catching sockeye salmon. They attribute its origin to one of the Hudson Bay Company's employees, who, they say, taught them a long time ago how to catch salmon in this way. Owing to the large number of men required to work them, and the fact that they can be worked only at certain stages of tide and in favorable weather, these nets have gradually been supplanted by other devices. In 1909 but five were used and these were operated off the shores of San Juan, Henry, Steuart, and Lummi Islands, and in the vicinity of Point Roberts.

### TROLLING.

Each year the catching of salmon by trolling becomes of increasing importance commercially. For some years sportsmen had this exciting and delightful occupation to themselves, but eventually the mild curers created such a persistent and profitable demand for king, or chinook, salmon that the fishermen, who had previously restricted

their operations to the use of nets during the annual spawning runs, which last but a small portion of the year, began to follow up the fish both before and after the spawning run and soon discovered that they were to be found in certain regions throughout nearly every month in the year.

The Monterey Bay, Cal., trollers use 48 cotton line generally. A few inches below the main lead an additional line is added, with a small sinker on it. This gives two lines and hooks, and as the main line has but the one lead, and that above the junction with the branch line, it floats somewhat above the latter, which is weighted down with a sinker. The main stem is about 20 fathoms in length, while the branch lines are about 5 fathoms each. These lines cost about $3.50 each. No spoon is used, but bait almost invariably. A few fishermen use a spread of stout steel wire, 4 feet long, with 5 or 6 feet of line on each end of the spread, two lines and hooks.

On the upper Sacramento River (mainly at Redding and Keswick) some fishing is done with hand lines. A small catch was made here in 1908, but none were so caught in 1909.

Even as early as 1895 trolling was carried on in the Siuslaw River, Oreg., for chinook and silver salmon. At Oregon City and other places on the Willamette River a number of chinook salmon are caught by means of trolling each year, mainly by sportsmen. A spoon is quite generally employed in place of bait. The fishermen claim that the salmon are not feeding at this time, as their stomachs are shriveled up.

For a number of years the Indians living at the reservation on Neah Bay, Wash., have annually caught large numbers of silver and chinook salmon in the Strait of Juan de Fuca. A few white fishermen also engage in this fishery at the present time in the same waters, while others troll for the same species, but more particularly silvers, in parts of Puget Sound proper. The ordinary trolling line, with a spoon instead of bait, is used.

The most remarkable trolling region is in southeast Alaska. For some years the Indians here had been catching king salmon for their own use during the spring months, and about the middle of January, 1905, king salmon were noticed in large numbers in the vicinity of Ketchikan. Observing the Indians catching these, several white fishermen decided to engage in the pursuit, shipping the product fresh to Puget Sound ports. They met with such success that 271,644 pounds, valued at $15,600, were shipped. The next year several of the mild-cure dealers established plants in this region, thus furnishing a convenient and profitable market for the catch, and as a result the fishery has grown until, in 1910, 204,823 king salmon and 6,000 coho salmon were caught and marketed. The length of the fishing season has also lengthened until now the business is prosecuted vigorously during about seven months in the year,

and in a desultory manner for two or three months more, only the severe winter weather preventing operations the rest of the year.

In southeast Alaska the fishermen generally use either the Hendryx Seattle trout-bait spoon no. 5 or the Hendryx Puget Sound no. 8. The former comes in nickel or brass or nickel and brass, the full nickel preferred. The Siwash hook no. 9/0, known as the Victoria hook in British Columbia, is in quite general use. As a rule, but one hook is used, and this hangs from a ring attached to a swivel just above the spoon, while the point of the hook comes a little below the bottom of the spoon. Occasionally double or treble hooks are used. Some fishermen use bait, and when this is done the herring, the bait almost universally employed, is so hooked through the body as, when placed in the water, to stretch out almost straight and face forward as in life.

A small commercial fishery is carried on in this region for coho salmon, mainly in August and September, in the neighborhood of Turnabout Island, in Frederick Sound. A Stewart spoon with two hooks on one ring is used, baited with herring in such a way that the fish is straightened out and faced toward the spoon. The sportsmen of Ketchikan also fish with rod and reel for this species in the neighborhood of Gravina Island, using a Hendryx spoon (kidney bait no. 6), which is silvery in color on one side and red on the other. Although much smaller than the king, the coho salmon is more gamy.

Reports from the trollers of southeast Alaska prove that all species of salmon will take the hook at some time or other in the salt waters of this region, an examination of their stomachs generally showing that they are either feeding or in a condition to feed.

### BOW AND ARROW.

On the Tanana River, a tributary of the Yukon River, in Alaska, the Indians hunt salmon in birch-bark canoes with bow and arrow. As the canoe is paddled along and the Indian sees the dorsal fin of the salmon cutting the surface of the muddy water he shoots it. The tip of the arrow fits into a socket, and when struck the tip, which when loose is attached to the stock by a long string, comes out of the socket and the arrow floats, easily locating the fish for the fisherman.

### SPEAR AND GAFF.

Spears of varying shapes and styles have been in use by the Indians from time immemorial and are still employed on many rivers in which salmon run. With the exception of the Chilkoot and Chilkat Rivers of Alaska, practically all of the catch secured in this manner is consumed by the fishermen and their families. In the Chilkoot River the Indians have built numerous racks in the stream and on the banks, upon which they stand and hook the fish out with a gaff attached to a pole. The catch is sold to the cannery located on Chilkoot Inlet.

## IV. FISHERMEN AND OTHER EMPLOYEES.

In the early days canning was a haphazard business, and workmen came and went as common laborers do in the wheat fields of the West. As the business increased in importance and the need of skilled labor became imperative, men were put to certain work and kept at it from season to season, with the result that in a few years a corps of highly skilled laborers had been evolved, and this had much to do with the rapid extension of the industry.

For many years Chinese formed the greater part of the cannery employees, the superintendent, foreman, clerks, machinists, and the watchmen alone being whites. No other laborers have ever been found to do the work as well or with as little trouble as the Chinese. In times of heavy runs, when the cannery would have to operate almost night and day in order to take advantage of what might be the last run for the season of the sometimes erratic salmon, the Chinese were always willing, even eager, to do their utmost to fill the cans, and if fed with the peculiar food they insisted upon having and due regard was had to certain racial susceptibilities, the cannery man could almost invariably depend upon the Chinese doing their full duty.

The Chinese-exclusion law cut off the supply of Chinese, and as the years went by and their ranks became decimated by death, disease, and the return of many to China, the contractors were compelled to fill up the rapidly depleting crews with Japanese, Filipinos, Mexicans, Porto Ricans, etc., with the result that to-day in many canneries special quarters have to be provided for certain of the races—more particularly the Chinese and Japanese—in order to prevent racial hatred from engendering brawls and disturbances.

The Japanese now compose about one-half of the cannery employees. While a few cannery men express themselves as well pleased with this class of labor, the majority find it troublesome.

In Alaska and at a few places in the States Indians are employed in the canneries. In Alaska more would be employed if they could be secured. They make fair workpeople, but are rather unreliable about remaining through the season.

The supplying of this kind of labor is done largely through the contract system. In the large cities along the coast are labor agencies, mainly owned by Chinese, which make a specialty of furnishing labor for this work. In the agreement between the canning

company and the contractor the company guarantees to pack a certain number of cases during the coming season and the latter agrees to do all the work from the time the fish are delivered on the wharf until they are ready to ship at the end of the season, for a certain fixed sum per case. Should the cannery pack more than the guaranteed number, which it usually does if possible, the excess has to be paid for at the rate per case already agreed upon, while if the pack, for any reason should fall below the contract amount the company must pay for the shortage the same as though they had been packed. The company transports the Chinese to the field of work and carries them to the home port at the end of the season. It provides them with a bunk house, and furnishes fuel, water, and salt. The contractor sends along with each crew a "boss," who has charge of the crew, and furnishes their food, the company transporting this free.

White men do the greater part of the fishing for salmon, many nationalities being represented, but Scandinavians and Italians predominating almost everywhere. A number of Greeks are to be found fishing in the Sacramento, while Slavonians do most of the purse-seining on Puget Sound. The native-born American is not often found actually engaged in fishing, but frequently is the owner of the gear or has a responsible position in the packing plants.

A number of Indians participate in the fisheries of Alaska, and a few fish in Washington. The only Chinese engaged in fishing are in Monterey Bay. A number of Japanese also fish in this bay, which is the only place in American territory where they fish for salmon, except in Alaska, where the small number of 13 were occupied in 1909. A number of Japanese engage in fishing in Canadian waters.

In many places on the coast, particularly in Alaska, fishing is a hazardous occupation. In Alaska most of it is done in the bays, sounds, and straits, where storms are frequent, and the annual loss of life is heavy. The records of the Alaska Fishermen's Union show for its members the following losses of life by drowning: 1905, 10 men; 1906, 5 men; 1907, 10 men; 1908, 17 men; and 1909, 17 men.

The fishermen early saw the advantages of organization, and nearly every river now has a union, which is subordinate to the general organization. One of the most typical of these is the Alaska Fishermen's Union, which has active jurisdiction over all sections of Alaska, except a portion of southeast Alaska. Early in the year this organization enters into contracts with the salmon canneries and salteries, by which the rates of wages, duties, etc., of the fishermen are fixed in advance. As a result of this mutual agreement upon terms, but little trouble is experienced with the fishermen, who generally conform scrupulously to the terms of the contract, and strikes and bickerings, which were very common a few years ago, are now almost entirely absent.

## V. FISHERY REGULATIONS.

### CONTROVERSIAL FORMS OF APPARATUS.

From time immemorial the users of certain forms of fishing apparatus have complained of and condemned the use of other forms, which, either through disinclination, through lack of financial means, or because it was not suitable for use in the section in which they fished, they themselves have not seen fit to employ. In some instances these complaints are well founded, but an unprejudiced observer is apt to view with suspicion charges advanced under conditions when personal interest may so easily cloud or color the individual judgment. In a court of equity it is a well-established principle that the plaintiff must appear with clean hands, and that is a difficult matter for the users of any form of apparatus in the salmon fisheries of the Pacific coast. If in one section the fishermen live strictly within the letter and spirit of the law, the users of the same apparatus in another section may be the most persistent and destructive violators. And, again, while the law may be strictly observed, the law itself may be inadequate or purposely deficient, and the apparatus therefore be doing incalculable damage to the fisheries.

While all forms of apparatus in use in the salmon fisheries of the Pacific coast have been objected to in some one section or another, the principal complaints have been against fish wheels and trap or pound nets. The wheels are used only in the Columbia River. The traps are found in the Columbia River and in the other waters of the State of Washington and in Alaska.

To the objections of other fishermen the owners of wheels and traps retaliate by charging prejudice and self-interest, and with some justification. It is unquestioned that these costly forms of apparatus are beyond the financial means of the ordinary fishermen, that their use reduces the number of persons employed in the fisheries, and that the owners, who are usually the packers or others closely affiliated with them, can, if they so desire, render themselves largely independent of other fishermen, such as the gill netters and seiners, and thus keep down the cost of the fish to the packers. Although not often advanced publicly, this is the real basis of the most of the complaints. Publicly the objections are based upon higher grounds,

such as the waste through catching and killing in wheels and traps of enormous quantities of salmon which can not be handled in the limited time available, or of species which the packers have no use for, and which they find it easier or less expensive to kill by much handling than to release and in so doing lose a few salmon.

One thing should never be lost sight of, however. Fishery apparatus is set for the purpose of catching fish, and its value is dependent upon the degree of effectiveness with which it accomplishes the object sought with the least expenditure of money and time for construction and operation.

It is a question whether, under present conditions, if the use of traps were abolished, the other forms of apparatus would be able to keep pace with the demand for fish. But the question of whether traps should be allowed or not in any one section should be settled by reference solely to the conditions prevailing in that section, and not to theoretical or general objections to traps as traps or to objections based upon trap fishing in some other and, possibly, vastly different section. There are some regions on the Pacific coast where if traps were permitted they would soon destroy the run of salmon, while there are many other sections where they would not injure the fisheries at all, unless possibly by use in too great numbers. The latter is especially true in many parts of Alaska, where the chief objection is that in a few places too many of them are grouped together.

A considerable part of the objection to the use of traps is doubtless due to the generally shameless disregard of the laws in the past, and in some sections also to-day. In Alaska up to 1908 the trap owners paid practically no attention to the laws, and the same is true to a large extent to-day on Puget Sound, and to a lesser extent, possibly, in the Columbia River. Since the enactment and rigid enforcement of the excellent trap law of 1906 in Alaska, the objections to trap nets have decreased very noticeably, though the traps have probably caught more fish than they did under the old conditions, the only difference being that the catch has been distributed more equally, and not, as in former times, caught chiefly in those traps situated nearest to the ocean, while those in the upper reaches took but few.

The Washington law prescribes minutely the method to be followed in closing traps during the weekly closed season and appears on its face to be an excellent plan. In practice it is quite otherwise, however, for one person can close or open the trap in one or two minutes' time, and all the watchman has to do in the weekly closed season is to let the apron down whenever he sees a boat approaching, raising it again as soon as he is sure the visitor is not a fish warden. Thus it is practically impossible to detect any but the boldest or most careless violations of the law.

The provision in the Alaska fisheries law regulating the manner of closing traps during the weekly closed season is without question the best in the country, and Washington could adopt it with much profit. It requires that "the gate, mouth, or tunnel of all stationary or floating traps shall be closed, and 25 feet of the webbing or net of the 'heart' of such traps on each side next to the 'pot' shall be lifted or lowered in such manner as to permit the free passage of salmon and other fishes." With two men stationed on the trap at least 15 or 20 minutes of most strenuous work is required to open or close the trap in this manner, and the fishery agent has ample time to reach the scene before the operation is completed. This fact has been found to be an excellent deterrent.

At first the owners advanced the plea that the lowering of 25 feet of the web of the heart next to the pot would so weaken the trap that it might be carried away by the very strong and high tides which prevail in Alaska, but three years' actual trial has proved this fear to be groundless, and now no objections are heard to this feature of the law.

Although not used to as great an extent, wheels have probably occasioned more controversy than traps. While the traps are usually set in either bays, straits, and sounds, where the water is salt or brackish, or in the lower reaches of all the rivers, the wheels are set in the upper courses of the Columbia River only. After the fish have run the gauntlet of the almost countless gill nets, seines, and trap nets in the lower and middle river, and are approaching their spawning beds, they meet with the runways leading to the wheels, which in some instances are set in natural channels in the cascades or falls, or in artificial channels through which the greater part of the run must of necessity pass. Nearly all of the salmon hatcheries on the Columbia are located either on the main river below Cascade Locks, or on one of the tributaries entering the river below there, while above this point there were operated in 1909 17 stationary wheels and 5 scow wheels.

It may be maintained that a salmon which has successfully evaded the nets in the section of the river below Cascade Locks is of vastly more importance to the preservation and perpetuation of the fisheries than a number which have not yet crossed the bar at the mouth of the river. Thus, it has been argued, while wheels have not done anything like the damage to the fisheries ascribed to them, a regard for the perpetuation of the fisheries of the Columbia River demands that their use, as well as that of all other forms of apparatus for the taking of fish commercially, should be prohibited above Cascade Locks.

This brings up the question of the justice of such an arrangement from the standpoint of the owners of the wheels. When they put

in these wheels their use was lawful, and the same is true to-day. They are expensive apparatus, and many thousands of dollars are invested in them. In addition there is an important salmon cannery located at Seuferts, just above The Dalles, which would be absolutely worthless if the above action were taken. It would be no more than just, if the States of Oregon and Washington decided to abolish all commercial fishing above Cascade Locks, that a fair valuation for losses be fixed by arbitration and paid to those affected.

There is also no question but what too many gill nets and trap nets are now being fished in the lower part of the river, and some scheme ought to be devised by which the number of licenses annually granted can be reduced very materially.

Strict regulations of the forms of apparatus used in the salmon fisheries and the curtailment of certain or all forms when they become too numerous will be of greater efficacy in the perpetuation of the industry than any other method which has been so far recommended or tried except that of closed seasons.

## LAWS AND THEIR ENFORCEMENT.

The history of the enactment and enforcement of laws relating to the salmon fisheries of the Pacific coast (except possibly California) is not one that those earnestly and sincerely desirous of preserving and perpetuating the fisheries have reason to be proud of. In the first place, it has been and is yet exceedingly difficult to secure efficient laws, owing to the influence of the selfish interests which have no regard to the future. In the second place, it was and is yet difficult to secure the enforcement of even the laws that are on the statute books. In most States a change in the governorship almost invariably entails a change in fish commissioner, who is often more concerned with pleasing the interests that secured his appointment and retain him in office than in giving the affairs of his department the attention that they require. This condition, not peculiar to the Pacific Coast States alone, doubtless will eventually be removed to a great extent by divorcing the fisheries departments from politics. The Pacific Coast States have had in the past and still have some earnest men who have been and are doing good work, and this number can easily be increased by making the positions permanent. Under present conditions a fish commissioner scarcely has a comprehensive grasp of the intricate problems of his department and begins to be of value to the State before a change of administration occurs and he is compelled to give way to another man, who in turn must be taught all that his predecessor had learned.

The worst condition of affairs in regard to the making and enforcement of fishery laws is found to prevail in those waters which form the boundary between States or between Canada and the United States.

The Columbia River, which forms the boundary between Oregon and Washington, affords a typical example of the evils which can result from a division of responsibility between two States. For many years each State enacted laws regulating the fisheries of the river with very slight regard usually to laws already in force in the other State. As a result of this the fishermen transferred their residence for license purposes from State to State as the laws of one or the other best suited their particular purposes.

The fishermen and packers also were in apparently irreconcilable conflict as to the proper means to be taken to conserve the fisheries, and each session of the legislatures saw strong lobbies present to work for certain selfish ends, while the few earnest men who had the real welfare of the fisheries of the river at heart had difficulty in making the slightest headway against the influence of these lobbies.

To further complicate the matter, in 1894 Oregon claimed that under the provisions of the enabling act admitting it as a State it had jurisdiction to the Washington shore, and proceeded to arrest Washington men who were fishing in what was the open season according to Washington law but the closed season under Oregon law.

In June, 1908, the voters of the State of Oregon had presented for their consideration two bills radically affecting the waters of Columbia River. One closed the river, east of the mouth of the Sandy River, against all fishing of any kind except with hook and line, and was originated by gill-net fishermen of the lower river for the purpose of eliminating fish wheels in the upper waters. This bill was the first presented to the people, and when it appeared the upriver men retaliated by presenting a bill affecting the lower river to such an extent that it practically prohibited the net fishermen from operating.

Very much to the surprise of all concerned both bills were passed and became laws on July 1, to take effect, as provided, on August 25 and September 10, respectively. The Oregon master fish warden proceeded to enforce both laws, arresting all violators on both sides of the river, irrespective of whether or not they were operating under a Washington or Oregon license, and incidentally did the fisheries a great service by bringing prominently before the public the anomalous condition of affairs which were occasioned by the archaic system under which the fisheries of the Columbia were governed. The State of Washington appealed to the United States courts, which, after argument, issued an injunction preventing the warden from enforcing the laws so far as the Washington fishermen were concerned.

In the meantime the attention of the general Government had been drawn to the apparently irreconcilable conflict between the two States, and fearing that in the mêlée the interests of the fisheries would be lost sight of, President Roosevelt, in a message to Congress, after reciting briefly the lack of harmony in jurisdiction by the

States, recommended that the general Government take over the control of the fisheries of the Columbia, as well as other interstate rivers.

This had the effect of bringing matters to a head and negotiations were soon in progress looking to the preparation of a treaty between the two States by which uniform laws would be adopted, and thus each State have concurrent jurisdiction to the opposite shore of the river. The legislatures each appointed a committee of eight members to confer and frame joint legislation. The two committees met in Seattle, Wash., early in 1909, and agreed upon the following recommendations:

First. A spring closed season from March 1 to May 1.

Second. A fall closed season from August 25 to September 10.

Third. A Sunday closed season from 8 p. m. Saturday of each week to 6 p. m. the Sunday following between the 1st day of May and the 25th day of August.

Fourth. We suggest the mutual recognition by each State of the licenses issued to floating gear by the other State.

Fifth. That the State of Oregon repeal chapter 89 of the session laws of Oregon for the year 1907, relative to the operation of purse seines and other like gear on the Columbia River.

Sixth. We recommend the enactment of similar laws in both States carrying an appropriation of at least $2,500 in each State and providing for the destruction of seals and sea lions and the granting of a bounty on the same, to be $2.50 for seals and $5 for sea lions.

Seventh. We recommend the repeal of both the fish bills passed under the provisions of the initiative and referendum in June, 1907, by the people of the State of Oregon, said bills being designated on the ballot as 318, 319 and 332, 333.

The recommendations were enacted into law by both States, and at the same time the State of Washington in its bill also prohibited fishing for salmon within 3 miles of the mouth of the Columbia between March 1 and May 1 and between August 25 and September 10, or salmon fishing on tributaries of the Columbia, except the Snake, between June 1 and September 15; and also prohibited fishing by any means for salmon save by hook and line in the Kalama, Lewis, Wind, Little White Salmon, Wenatchee, Methow, and Spokane Rivers and in the Columbia River 1 mile below the mouth of any of the rivers named. The agreement was subjected to a rather severe strain, however, when it was discovered that the Oregon Legislature had failed to provide the same closed periods for the tributaries that were enacted for the Columbia, thus leaving the Willamette, Clackamas, Lewis and Clark, and Youngs Rivers and Spikanon Creek open to fishing for 15 days in March and 15 days in April, while the Columbia was closed. The cry of bad faith was at once raised by the Washington fishermen, and for a short time it appeared that the agreement would be broken at the very beginning. The Oregon Board of Fish Commissioners took the matter up, however, and by

order closed these streams to all fishing during the times of closed season on the Columbia, and thus restored peace once more.

The conditions which prevail in Puget Sound adjacent to the boundary between Washington and British Columbia have also been the cause of serious anxiety to those interested in the perpetuation of the salmon fisheries. The great schools of sockeye salmon which are on their way from the ocean to the spawning beds in the Fraser River pass through this section, and it is here that the greater part of the fishing is done. The Province of British Columbia has made earnest efforts to preserve this run, but unfortunately the same can not be said of the State of Washington. The laws are fairly good, but owing partly to the small force and facilities available for executing them and partly to other reasons, they have not always been enforced as they should be.

This condition of affairs on Puget Sound and similar conditions in other boundary waters led the general Government to take up the matter, and on April 11, 1908, a convention was concluded between this country and Great Britain for the protection and preservation of the food fishes in international boundary waters of the United States and Canada. Both Governments appointed international commissioners—Dr. David Starr Jordan for the United States and Mr. S. T. Bastedo (who was succeeded later by Prof. Edward Ernest Prince) for Canada—whose duty it was to investigate conditions prevailing in these waters and to recommend a system of uniform and common international regulations. After an exhaustive investigation the commissioners submitted recommendations, which included the following affecting the boundary waters dividing the State of Washington and the Province of British Columbia, these waters being defined as the Strait of Juan de Fuca, and those parts of Washington Sound, the Gulf of Georgia, and Puget Sound lying between the parallels of 48° 10′ and 49° 20′:

GENERAL REGULATIONS.

*3. Disposition of prohibited catch.*—In case any fish is unintentionally captured contrary to the prohibitions or restrictions contained in any of the following regulations, such fish shall, if possible, be immediately returned alive and uninjured to the water.

*4. Dynamite, poisonous substances, etc.*—No person shall place or use quicklime, dynamite, explosive, or poisonous substances, or electric device in treaty waters for the purpose of capturing or killing fish.

*5. Pollution of waters.*—No person shall place or pass, or allow to pass, into treaty waters any substance offensive to fishes, injurious to fish life, or destructive to fish fry or to the food of fish fry, unless permitted so to do under any law passed by the legislative authority having jurisdiction.

No person shall deposit dead fish, fish offal, or gurry in treaty waters, or on ice formed thereon, except in gurry grounds established by the duly constituted authorities.

*6. Capture of fishes for propagation or for scientific purposes.*—Nothing contained in these regulations shall prohibit or interfere with the taking of any fishes at any time for propagation or hatchery purposes, and obtaining at any time or by any method specimens of fishes for scientific purposes under authority granted for Canadian treaty waters by the duly constituted authorities in Canada and for United States treaty waters by the duly constituted authorities in the United States.

*12. Capture of immature salmon prohibited.*—No salmon or steelhead of less than 3 pounds in weight shall be fished for, killed, or captured in treaty waters.

*13. Salmon weirs, etc., above tidal limits prohibited.*—No salmon and no steelhead shall be fished for, killed, or captured by means of a net of any sort, any weir or any fish wheel, above tidal limits in any river in treaty waters.

*14. Close season for sturgeon.*—During the term of four years next following the date of the promulgation of these regulations no sturgeon shall be fished for, killed, or captured in treaty waters.

*15. Capture of fish for fertilizer or oil prohibited.*—Fishes useful for human food shall not be fished for, killed, or captured in treaty waters for use in the manufacture of fertilizer, or of oil other than oil for food or medicinal purposes.

*16. Naked hooks and spears prohibited.*—No spear, grappling hook, or naked hook, and no artificial bait with more than three hooks, or more than one burr of three hooks attached thereto, shall be used for the capture of fish in treaty waters. This regulation shall not prohibit the use of a gaff in hook-and-line fishing.

*17. Torching prohibited.*—No torch, flambeau, or other artificial light shall be used as a lure for fish in treaty waters.

The following regulations relate specifically to the waters named:

STRAIT OF JUAN DE FUCA AND ADJACENT WATERS.

The following regulations (62 to 66, inclusive) shall apply to the Strait of Juan de Fuca, those parts of Washington Sound, the Gulf of Georgia, and Puget Sound lying between the parallels of 48° 10′ and 49° 20′ north latitude:

*62. Close season for salmon.*—From August 25 to September 15 in each year, both days inclusive, no salmon or steelhead shall be fished for, killed, or captured for commercial purposes in these treaty waters; provided, however, that in the waters to the westward of a line drawn southward from Gonzales Point to the shore of the State of Washington silver salmon, or coho salmon, may be fished for, killed, or captured from September 1 to September 15 in each year, both days inclusive.

*63. Weekly close season for salmon and steelhead.*—From 6 o'clock Saturday morning to 6 o'clock on the Monday morning next succeeding, no salmon or steelhead shall be fished for, killed, or captured in these treaty waters.

It is, however, provided that in the waters to the westward of a line drawn southward from Gonzales Point to the shore of the State of Washington the weekly close season shall begin 12 hours earlier, and shall end 12 hours earlier.

*64. Construction of pound nets.*—All pound nets or other stationary appliances for the capture of salmon or steelhead shall be so constructed that no fish whatever shall be taken during the weekly close season. The erection or addition to the pound net of a jigger is prohibited.

*65. Location of pound nets.*—All pound nets shall be limited to a length of 2,500 feet, with an end passageway of at least 600 feet between one pound net and the next in a linear series, such distance being measured in continuation

of the line of direction of the leader of such net, and a lateral passageway of at least 2,400 feet between one pound net and the next.

On and after January 1, 1911, the mesh in pound nets shall be 4 inches in extension in the leader and not less than 3 inches in other parts of the net.

66. *Nets other than pound nets.*—No purse net shall be used within 3 miles of the mouth of any river and no seine within 1 mile of the mouth of any river in these treaty waters.

No gill net of more than 900 feet in length or of a greater depth than 60 meshes shall be used in these treaty waters.

In Alaska previous to 1906 the conditions prevailing were very similar to those in Oregon and Washington, but in that year Congress enacted a comprehensive and excellent law regulating the fisheries, the enforcement of which was entrusted to the Bureau of Fisheries. The force of agents is still inadequate, although materially increased in 1911, and its facilities for covering the territory are very meager. Conditions approaching the ideal will not prevail until these defects have been remedied; but respect for the fishery laws in Alaska obtains very generally now as a result of their persistent enforcement during the past five years.

## VI. METHODS OF PREPARING SALMON.

### CANNING.

#### EARLY DAYS OF THE INDUSTRY.

In the salmon industry canning is, and has been almost from the time of the discovery of a feasible method of so preserving the fish, the principal branch. The first canning of salmon on the Pacific coast was on the Sacramento River in 1864, when Messrs. G. W. and William Hume and Andrew S. Hapgood, operating under the firm name of Hapgood, Hume & Co., started the work on a scow at Washington, Yolo County, Cal. The Hume brothers, who came from Maine originally, had been fishing for salmon in the Sacramento River for some years before the idea of canning the fish had entered their minds, while Mr. Hapgood had previously been engaged in canning lobsters in Maine, and was induced by the Humes to participate in order that they might have the benefit of his knowledge of canning methods. The late Mr. R. D. Hume, who worked in the original cannery and later became one of the best known canners on the coast, thus describes the plant and the methods employed:[a]

Before the arrival of Mr. Hapgood [from Maine] the Hume brothers had purchased a large scow, on which they proposed to do the canning of salmon, and had added an extension to the cabin 18 by 24 feet in area, to be used as a can-making shop. This had a shed on the side next to the river for holding any cans that might be made in advance of the packing season. A few days after the arrival of Mr. Hapgood [March 23, 1864], the tools and machinery were packed and put in position. Mr. Hapgood made some stovepipe and two or three sheet-iron fire pots, and in a short time was ready for can making. The following list of tools and machinery will shown how primitive our facilities were as compared with present methods: 1 screw hand press, 1 set cast-iron top dies, 1 set cast-iron bottom dies, 1 pair squaring shears, 1 pair rotary shears, 1 pair bench shears, 1 pair hand shears or snips, 1 pair 24-inch rolls, 1 anvil (weight 50 pounds), 1 forging hammer, 1 tinner's hammer, 1 set punches for making stovepipe, 1 rivet set, 1 grooving set, 2 iron slabs grooved on one side to mold strips of solder, 1 iron clamp to hold bodies of cans while soldering the seams, 1 triangular piece of cast iron about three-eighths of an inch in thickness and 6 inches in length, with a wooden handle attached to the apex, also used for holding can bodies in place while being seamed.

[a] The first salmon cannery. By R. D. Hume. Pacific Fisherman, vol. II, no. 1, January, 1904, p. 19–21.

The process of canning was as follows: The bodies of the cans were first cut to proper size by the squaring shears, a line was then scribed with a gage about three-sixteenths of an inch from one edge, and they were next formed into cylindrical shape by the rolls. They were then taken to the soldering bench, and one edge lapped by the other until the edge met the line that had been scribed and fastened there by being soldered a small part of the length to hold them in place for the further purpose of seaming. They were then placed either in the iron clamp, which had a piece of wood attached to its under side, and held firmly, the clamp being closed by the operation of a treadle, or were slipped on a piece of wood, which was bolted to the bench, while being held in place by the triangular hand seamer, which was pressed down on the lap of the seam by the left hand of the operator. When this had been done a piece of solder, which had been prepared by shaking in a can together with rosin, was placed on the seam, and melted and rubbed lengthwise of the seam. After cooling the bodies were ready for the end or bottom, which operation was brought about by first cutting out circular blanks with the rotary shears, and then placing them in the cast-iron die, and bringing the handle of the screw press around with a swing with force enough to form up the end or bottom. In this operation there were many difficulties, as the ends or bottoms would many times stick to the upper part of the die and refuse to come off, and finger nails were pretty short in those days. To get the ends out of the lower part of the die was not so bad, as a wooden plunger operated by a treadle knocked them out, but sometimes they were in pretty bad shape. When the bottoms or ends were ready they were slipped on the bodies, and the edge of the bottom rolled about in a pan of powdered rosin until the seam was well dusted. A piece of solder similar in size and preparation as used for the side seam was placed in the can. They were then placed on the smooth side of the cast-iron slabs, and the operator, with a hot soldering copper shaped to fit the circle of the can, melted the solder and, by turning the can rapidly, soldered the full circumference. The output of this can factory was very imperfect, as at least one-half of the seams burst, owing to the lack of experience of the manager or want of good judgment.

When the can making was well underway Mr. Hapgood then turned his attention to getting the apparatus for canning on board the house boat. This in the cooking department consisted of a kettle made of boiler iron about 36 inches in diameter and 5 feet in depth, set in a brick furnace and fired from underneath. Alongside was a round bottom cast-iron pot holding about 60 gallons of water and heated in the same manner. These kettles, with a dozen coolers or circular sheet-iron pans with ropes attached and with holes cut in the bottoms for drainage, a set of 5-inch blocks and tackle, with a sheet-iron fire pot and a scratch awl, completed the bathroom outfit. The can filling and soldering room was furnished with a table through the center, where cutting the salmon in pieces to suit and the filling of the cans was done. On each side of the room there was a bench running the full length, on the end of one of which the cans were placed to receive the pickle, which was used at that time instead of the small quantity of salt that is placed in the cans during the operations of these later days. After the salmon had been cleaned by removing the entrails and washing them outside the covered portion of the scow, they were brought inside and placed on the table, and a man with a butcher knife in one hand and a stick in the other, which had a mark showing the length of the pieces desired, cut gashes in the side of the salmon as a guide, and then cut the fish into sections corresponding to the length of the mark on the stick. He

then proceeded to cut the sections in pieces to suit the cans. Then three or four operators placed the salmons in the cans and shoved them along the table to where a boy wiped the top edge and passed them along to two others who placed tops which fitted inside of the rim. The cans were then taken in wooden trays to the bench opposite the starting point, which was fitted with four sheet-iron pots, and at the one nearest the entrance to the house on the scow a man put a soldering flux on the top edge, which was made by adding zinc to muriatic acid, and then with a pointed soldering copper and a stick of solder melted the solder until a small portion could be drawn around the groove formed by the edge of the can and the bevel of the top. From there the cans were taken to the other parts of the bench, where two men finished soldering the head in, and then taken to the third man, who soldered, or, as it was called, buttoned the end of the seam lap. The cooking department or bathroom, as it was called, was separated from the filling and soldering room by a partition. The cans were shoved through a hole in the partition.

At this time the process was a secret. Mr. Hapgood did the cooking and all the work done inside, no one but a member of the firm being allowed to go in. This privacy was continued until the firm moved to the Columbia River and, the labor becoming too arduous for Mr. Hapgood to perform alone, a boy by the name of Charlie Taylor was taken in as an assistant. * * *

But to return to the original proposition: When the filled cans had been soldered and entered the bathroom they were put in the coolers and lowered into the cast-iron pot, one cooler of cans being cooked at a time. The cooler was lowered into the boiling fresh water until the cans were submerged to within 1 inch of the top ends and left to cook for one hour; then they were hoisted out and the vent holes in the center of the top soldered up, after which they were dumped into the boiler-iron kettle, which held a solution of salt and water of density sufficient to produce, when boiling, a heat of 228° to 230° F. They were cooked in this solution for one hour and then taken out of the kettle with an iron scoop shaped like a dip net, with a wooden handle about 6 feet in length. They were dumped into a tank of water on the other side of the partition which separated the bathroom from the packing room through an opening in the partition, receiving many a bump and bruise in the operation. Then they were washed with soap and rag to remove the dirt and grease, each can being handled separately. When this was done they were piled on the floor of the packing room and in a few days were painted with a mixture of red lead, turpentine, and linseed oil, for at that time buyers would have no canned salmon, no matter how good the quality, unless the cans were painted red.

When packs of 10,000 to 15,000 cases were made in a season only the absolutely essential machinery was used, the rest of the work, such as cutting and cleaning the fish and placing them in the cans, being done by hand. When larger canneries were constructed, especially in Alaska, where labor is expensive and difficult to obtain, the greater part of the workmen having to be brought up from the States, machinery to do as much as possible of the work became absolutely essential. The inventive genius of the country came to the rescue and one by one machines for cutting and cleaning the fish, filling the cans, putting the tops on, and washing them, were invented and put into use, while automatic weighing machines were produced and extensive improvements and alterations were made in the machines previously in use. There are to-day many large manufacturing es-

tablishments which devote all or the greater part of their facilities to furnishing machinery and supplies to this giant branch of the salmon industry.

When salmon canning was in its infancy a pack of from 150 to 200 cases was considered a good day's work. Now it is not an uncommon occurrence for a cannery to turn out from 1,500 to 2,000 cases in one day, and there are a few which have even greater capacity.

During the height of the salmon run a cannery is an exceedingly busy and interesting place, and a description of the methods used at the present time will show the giant strides the industry has made since the days of Hapgood, Hume & Company.

### HANDLING THE SALMON.

At convenient spots near the fishing grounds large scows and lighters are anchored and the fishing crews deliver their catches aboard these, the tallyman on each scow keeping a record and giving the crew a receipt. Men fishing near the cannery deliver their catch alongside. Steamers and launches are used to tow out empty scows and bring in those filled. In the old days the fish were pitched by hand into bins on the wharves, but this laborious method has been superseded by the use of an elevator, which extends from a short distance above the top of the wharf to the water's edge, provision being made for raising or lowering the lower end according to the stage of the tide. This elevator is slanting, and is made of an endless chain operating in a shallow trough. About every 2 feet there is attached to the chain a crosspiece of wood. At the top of the elevator are chutes which deliver the fish at various convenient spots on the cutting-room floor.

At a few places tracks have been run down to the low-water stage and the steamers, launches, and scows come alongside these, small cars being run down to meet them, and be filled by men pitching the fish from the boats, the cars when filled being run up into the cutting room and dumped upon the floor. At other places men armed with pews (single-tined forks) pitch the fish up to the wharf, where other men pitch them to the cutters.

If the salmon have been in the scows for from 20 to 24 hours they are used as soon as possible after being delivered at the cannery; otherwise that length of time is usually allowed to elapse, the cannerymen claiming that if not allowed to shrink the fish will be in such condition that when packed much juice will be formed, so that in "blowing," after cooking, light-weight cans will be produced. The danger of canning fish that are too fresh, however, is of minor importance as compared with the tendency in the other direction.

Before dressing the fish a stream of water is kept playing over them in order to remove the dirt and slime, after which men with pews separate the different species into piles.

### DRESSING.

The majority of the canneries still use the old hand method of dressing the fish, and in such places the selection of the butchering or dressing gangs is of prime importance. Two men constitute a "butcher's gang," and the number of these gangs is dependent upon the output of the plant. Boys place the fish, with the head out, upon the cutting tables. One man cuts off the heads, and is followed by another who removes the fins, tails, and viscera. The offal is thrown into a chute, whence it passes into the water under the cannery, while the dressed fish is transferred to a tank of water, to be scaled, washed, and scraped. It is then passed to another tank of water, where it receives a second washing, scraping, and final brushing with a whisklike broom, which removes any offal, blood, and scales that were overlooked in the first washing, after which it is removed to large bins on either side of the cutting machine.

The most useful cannery inventions in recent years have been of machines for doing the work of the dressing gangs. Several have been invented and work more or less satisfactorily. The one now in general use in canneries where such machines are employed was first used in 1903 at Fairhaven (now Bellingham), Wash. It removes the head, tail, and fins and opens and thoroughly cleans the fish ready to cut into pieces for the cans. By the use of these machines the dressing gang is almost entirely done away with, dispensing with 15 to 20 men.

### CUTTING.

The usual method of cutting the salmon is by a machine. This is generally a large wooden cylindrical carrier, elliptical in shape, thus having a larger carrying capacity. Ledges or rests on the outside the length of the carrier are wide enough to hold the fish, and are slit in cross section through the ledges and outer casing to receive the gang knives. The latter are circular, fixed on an axle at the proper distances apart, and revolve at the highest point reached by the carrier and independently of the latter. The carrier and gang knives are set in motion, each revolving on its own shaft. As a rest on the carrier comes to a horizontal position, men stationed at the fish bins lay a fish on each ledge as it passes. Thence it is conveyed to the revolving gang knives and, after being divided, passes through on the downward course, sliding off the rest into the filling chute. The knives in these machines are so arranged as to cut the fish transversely in sections the exact length of the cans to be filled.

The rotary cutter shunts the tail pieces to one side, and these are carried by means of a chute to baskets. But few of the larger tail pieces are canned, the rest being thrown away, this forming a con-

siderable part of the tremendous annual waste of the salmon canneries. As the tail portion is much smaller, with less meat, it can not be placed in the cans with the middle and head sections without detracting from their value, but if packed under a distinct and separate label, as is now done in a few canneries, there is no reason why the tails should not supply the demand for a cheap grade of fish.

In some of the smaller canneries, especially in those packing flat cans, the gang knives are worked by hand. In this case the knives are not circular, but elongated or semicircular in shape, tapering at the outer ends. They are mounted on an axle having a large iron lever at one end, and when this lever is raised the ends of the gang knives are thrown up and back. The fish is then placed in position under them and the lever pulled forward, the knives, with a scimitar-like movement, dividing the fish.

The original method of cutting was by means of a long knife wielded by a Chinaman who stood at a regular butcher's block. Although his strokes were incredibly quick, the rotary cutting machine is a vast improvement over the old way.

### SALTING.

Every can of salmon is seasoned with one-fourth of an ounce of salt, which, to insure uniformity, is added by mechanical means. A table is used, in the top of which are holes equal distances apart. On the under side of the top is a sheet-iron plate, with an equal number of holes, which slides in a groove at the sides, and is worked either by a hand or foot lever. Just below is an open space large enough to accommodate a tray holding 36 or 48 cans. A workman stands in front of the table and slides a tray of cans into the open space. He then throws a quantity of salt upon the table and immediately scrapes this off with a thin piece of wood, each hole being filled in the operation, and the salt being prevented from falling through by the iron plate underneath. The lever is then pressed, the iron plate moves forward until the holes in it are directly under the table top, when the salt drops through into the cans. This operation can be repeated four or five times in a minute.

### FILLING THE CANS.

Most canneries now use filling machines, although a few, more particularly those packing flat and odd-sized cans, still fill by hand.

The filling machine consists of a chute with a belt to which are attached wire racks about 4 inches apart, set at an angle to prevent the salt from spilling out, into which the salted cans are fed from the floor above and pass into the machine. At the same time the divided sections of salmon pass down another chute into the mouth of what

looks like a hand coffee mill. They pass through here down a smaller chute and are forced by two dogs into a receptacle through which the plunger, or filler, passes. Here the plunger comes opposite the open mouth of the empty can, which when it reaches this point is caught by a clasp or hook and held in front of the plunger, which is immediately thrust forward through a chamber filled with salmon, cutting the fish longitudinally and at the same time filling the can. The next movement forces the can out upon a table. When running at full speed one of these machines will fill about 80 cans a minute.

On being released by the clamp the cans roll upon a long table and are picked up by a man stationed here, who strikes each one upon a square piece of lead set in the table, in order to settle the contents down into the can and for the purpose of detecting any deficiency in weight. If not quite full the cans are pushed to the other side of the table, where a man adds the quantity of fish needed, a supply of small bits being kept at hand for this purpose. Generally the cans overrun in weight, frequently as much as an ounce. Occasionally a can is weighed in order to see that the machine is in perfect adjustment.

In the hand method the fillers stand on each side of a long table with a trough running down the middle from end to end. This is filled with the cut pieces of salmon, and the fillers, usually women and children, put into the cans large pieces at first and then smaller pieces to occupy the vacant spaces.

### WASHING THE CANS.

The cans are put upon an endless belt by a workman and pass from the filling-machine table to the washing machine. This is a rotating apparatus, consisting of an iron framework holding 10 rests or stands on which the cans sit. Immediately overhead are small perpendicular shafts with an iron cap, the diameter of a can, fixed to the end of each. Each can as it reaches the machine is caught by one of the washers and the cap brought down over the top, a tight-fitting flange preventing water from getting inside. Revolving rapidly as it goes, with a stream of water against it of sufficient force to remove the dirt and grease, the can is carried until the machine has revolved 180 degrees, when it is released and passes out on a belt. A more modern method is to use jets of steam for washing, while one of the latest devices is to clean the cans by a cold-air blast which strikes directly on the top edge. A set of brushes against which the cans revolve is used in a few canneries.

After being washed the cans continue on an endless belt and pass two children whose duty is to put a small piece of scrap tin on the top of each. These pieces are called "chips," are from 1½

to 2 inches, and are scraps from the sheet tin used in making the tops of the cans. The shape is of no particular importance so long as the pieces are long enough to cover the hole in the top of the can, or the cap as it is called.

### CAPPING.

The endless belt delivers the can to the capping or topping machine. On reaching this the can passes under a cap holding a top, the latter being fed in through a separate aperture, and the cap immediately falls with just sufficient force to put the top on the can without injuring either. The can is then forced out from under the capper by the rotation of the machine, and the next capper is brought around to receive another can. As the cans revolve they are carried under a crimper, situated directly opposite the capper, which presses the edge firmly around the body. While one can is being topped another is being crimped, after which it rolls out upon a belt on its side, and is taken through the acid trough. Before the tops are sealed the edges must be treated with a solution of muriatic acid, which is in a glass receptacle and is applied as the cans are rolled through the acid trough on the endless belt.

### SOLDERING.

For many years the tops and also all other parts of a can were soldered by hand, a long, tedious, and expensive process, which eventually gave way to the soldering machine. This is composed of an endless chain about 6 feet long, revolving around two shafts at either end of an iron trough. In the bottom of the trough is the solder, which is kept at molten heat by a row of oil blast jets underneath. Between the lower part of the chain and trough is just enough room for a can to pass without jamming, and they are forced along the trough by a chain in contact with their sides. They enter the trough at an angle, their bottoms slightly inclined, which causes the top rim to be submerged in solder, thus distributing it evenly all around the edge.

In passing through the trough the cans make about half a dozen revolutions, which cause the tops to become very hot, and it is to prevent them from being blown off by the pressure of the steam which quickly generates that the center hole in the top is made. The "chip" previously mentioned prevents the hole from being choked with salmon.

A soldering machine having, instead of the endless chain to give motion to the cans, a metal spiral running the length of the machine and revolving on an axle through the center, is used in some canneries. Each loop grasps a can and follows it to the end, thus giving the cans the proper motion and preventing them from rolling

side by side and lapping the solder over the ends, as is frequently the case with the chain machines.

A few canneries use a revolving cooler, which has a disk upon which the cans rest. This disk is filled with running water, and after it makes two revolutions the cans are forced into an inclined trough under a stream of water. The usual method, however, is for the cans on leaving the soldering machine to pass under several jets of water to set the solder and at the end of the belt to be transferred by workmen to coolers or crates, which are made of flat strap iron, square shaped, and hold about 96 cans. The crate having been filled, it is placed upon a square truck and rolled aside, where the vent holes are stopped with a drop of solder.

### TESTING.

The testing tank is a square wooden tank filled with water heated almost to the boiling point by steam pipes arranged in a coil at the bottom. The crates are hoisted into the test tank by a block and tackle attached to an overhead track, which permits the coolers to be swung to any place desired.

This test is for the purpose of detecting leaks due to imperfect soldering and is conducted by two workmen skilled in this operation. The slightest leak is detected by the appearance of small bubbles issuing from the cans. The spots where the bubbles appear are marked with a small iron tool held in the hand, and the cans are taken out and placed in small wooden trays, in which they are carried to the bench men, whose duty it is to mend them. Cans that have been mended are again tested as before. The bench men are located in front of a long bench on which are numerous fire pots, supplied with oil and air led through small tubes, in which the soldering irons are kept heated, the heat and air being regulated by connecting valves. Kerosene oil and gasoline are the fuels generally used now.

### COOKING.

The salmon are invariably cooked in rectangular retorts which rest in a bed and have a track running the long way. In front of each is a turntable for the purpose of receiving trucks coming from any direction. Four trucks each holding 6 crates of cans, piled one upon another, are run into the retort, which is then closed and steam turned on, entering at the bottom. The amount of pressure is from 6 to 12 pounds, the heat 250° F. In most establishments the first cooking is continued about 60 minutes.

After the first cooking the crates are taken out and placed on a long table called a "venting table," where the cans are pricked with a wooden-headed hammer fitted with a small brad, to allow the steam

and superfluous water to escape. After the venting has been done the holes are soldered up, the crates again loaded on a truck and rolled into the second retort, where they are subjected to the same pressure of steam and heat as in the first cooking and for a period of about 60 minutes.

In some canneries the retorts for first cooking are made of heavy plank, well bolted to resist the steam pressure.

In the early days much secrecy and mystery was thrown about the cooking, and the work was carried on in a separate room, known as the "bathroom," under lock and key. The first cooking was done in common tubs. The early retorts were made of wood. Later, round iron kettles were substituted, nearly one-half consisting of cover, and round crates were used for holding the cans.

For many years cannery men believed that the double cooking of salmon was absolutely necessary, but in 1898 Mr. F. A. Seufert, at his cannery on the Columbia River, at Seuferts, Oreg., a short distance above The Dalles, discarded this idea, and has since used a one-cooking method. By the new process the cans are tested for leaks after the center hole in the top is soldered up, as before, and are left in the retort 70 minutes at 245° F. and 12 pounds steam pressure. According to its originator, this method saves more than one-half the labor in the bathroom, saves nearly one-half the labor in washing the cans after cooking, and also better retains the color of the fish.

### SANITARY, OR SOLDERLESS, CANS.

A recent improvement in the canning business, and one which accomplishes the same purpose as the single cooking in retorts, is that of "sanitary cans," so called. In order to use these cans a quite radical, but economical, change in machinery is necessary. As the cans leave the filling machine they pass into a steam exhauster, consisting of a box about 30 feet in length, in which are three endless-chain belts running side by side. Under and over each belt are steam coils, and under each of the lower coils are single pipes, which through small holes throw jets of live steam upon the coils, creating an intense heat. The cans pass along the first belt, are then transferred to the second belt, on which they return to the entrance of the box, whence they pass to the third belt, and continuing along this to the end pass out to the topper and crimper, the whole operation occupying five minutes' time. One style of exhauster has 10 ovals formed by the pipe, and the cans pass along these from side to side of the exhauster until discharged at the far end. By this means the contents of the can are heated and the greater part of the air exhausted, which is the object of the first cooking in the retort under the method in general use.

The topper and crimper is a circular machine with six rests for the cans. The first work performed by the machine is to "true up" the upper edge of the can, which is done by a plunger that presses the upper flange of the can upon a shoulder. In the meantime the top, which is coated around the outer edge with cement, has been automatically fed into the machine, is now clamped on the can, and by another operation is crimped on tight. The cans then leave the machine on an endless conveyer and pass to the men who transfer them to the coolers, and these are immediately placed upon the trucks and run into the retort for the one cooking they are to receive. The time they are to remain here is somewhat variable, 70 to 125 minutes with a temperature of 242° F. being the common period.

By the use of these cans the soldering machine, and in fact all use of solder and acid, is done away with, a distinct sanitary improvement, for sometimes the substances would get into the can and cause a deleterious chemical change in the contents. It also does away with the first cooking and the subsequent venting and soldering, a saving both in labor and time consumed.

### REPAIRING CANS.

Imperfect cans which are repaired before the first cooking are naturally in the same condition as if there had been no defects. If the leaks are discovered after cooking and are repaired at once and the contents recooked, they are still very good, the only difficulty being that by blowing or venting them a second time they lose weight. The above goods usually go in with the regular pack of their kind and are not classed as regular "do-overs."

When, however, a cannery is running at full capacity, defective cans can not always be repaired and recooked at once and are sometimes set aside for days. Decomposition follows, of course, as with any other meat that is exposed to the air, and the fish becomes unfit for food. When recooked the meat becomes mushy and the blowing or venting makes the cans very light, a defect which is frequently corrected by adding salt water. This, the "do-over," is the lowest class of goods. In the old days, and even yet to some extent, such cans are sold without labels to brokers, or else are given some indefinite label, perhaps with the name of some fictitious cannery, and sold in the lumber, mining, or negro districts, or shipped to foreign countries with less fastidious tastes in the matter of salmon. In 1910 one of the leading companies of Alaska adopted the policy of throwing overboard all "do-overs."

On coming from the second retort the crates are lowered into a bath of lye, or, as in some canneries, the cans are run through such a bath on an endless belt, which, with the aid of a slight rinsing and a

few rubs with a brush over the top, removes from the can all the grease and other material, and then passes them into another bath where the lye is washed off in hot fresh water. The cans then go to the cooling room, where a stream of water is played upon them, or, during rainy weather are placed out of doors upon the wharf, and there allowed to cool.

The top and bottom of the cans contract in cooling, and for several hours a sharp popping noise is heard. Here, as in nearly every process through which they pass, the cans are again tested, this time by tapping the tops with a small piece of iron about 6 inches long, or, sometimes, a 12-penny nail. The sound conveys to the ear of the tester an unmistakable meaning as to the condition of the can, and the faulty cans that escape notice during the other tests are invariably found in this one.

### LACQUERING.

An almost universal custom in the salmon-canning industry, but one that is not common in the canning of vegetables, fruits, etc., is that of lacquering the cans. This idea of protecting the can on the outside has been followed from the very beginning, for two reasons: (1) That the English market which, at that time especially, absorbed the greater part of these goods, insisted on their shipments being finished in this way, and (2) from the fact, as these canners speedily found out, that if they did not protect their cans in some way enormous losses through rust would ensue.

The first experiment of this nature was to paint the cans by hand with red paint, treating each singly. Next a composition of logwood extract and alcohol was tried, which, however, did not produce satisfactory results for a very plain reason—the can was dyed instead of being lacquered. The next attempt was to varnish the cans with a japan varnish reduced with alcohol, but this was found to dry too slowly for speedy handling. After extended experimentation the quick-drying brown lacquer of the present time was evolved, which carries asphaltum in the form of an asphalt varnish as its base, this being supplanted in some cases by gilsonite. This lacquer can be procured in either a heavy or light body. is generally reduced with benzine or gasoline, and is applied according to the requirements of the market, which in some localities demands a heavy coating and in others a much lighter finish, the latter giving a rich golden brown color. Some experiments have also been made in using brighter colored lacquers for this work. Several of these, made to give a bright golden, copper, or other color, are extremely attractive in appearance, while at the same time protecting the tin against rust quite as well as the brown.

The industry soon outgrew the hand method of lacquering, and the process which for a number of years was universal in the trade, and is still used by some canneries, succeeded it. For this there are a number of rectangular box vats about 40 by 80 inches and 18 inches in depth, the number varying with the capacity of the cannery. These are usually lined with galvanized metal and provided with a gridiron-shaped iron frame, hung from a windlass or other tackle for lifting or lowering from top to bottom of the vat. The cans are loaded on this gridiron, being placed in an inclined position to allow the draining of the lacquer, and are lowered in the vat sufficiently to submerge them in the lacquer with which the vat is charged to a depth of 7 to 10 inches. The loaded gridiron is then raised to the top of the vat and the cans allowed to drain and dry before piling. This method, while being more effective in regard to the volume of work, was still of necessity a very slow and tedious operation. In damp or rainy weather, especially when it is not possible to open warehouse doors and windows, the gas arising from a number of these vats makes effective drying almost impossible.

Another principal objection to this method of lacquering, which applied also to all earlier attempts, was the impossibility of obtaining an even coat of lacquer when the can was allowed to dry in any stationary position. There was also a large waste by evaporation.

Notwithstanding repeated efforts at invention, however, it was not until 1901 that an effective machine for handling this difficult work was put on the market. The apparatus now in use by a number of canneries receives the cans on a revolving wheel fitted with rests for holding them while passing through the lacquer bath. From here they roll upon an endless chain which revolves the cans as they pass through a long box in which a hot blast dries them before they reach the end of the machine. The rotating or rolling motion given to the can after the lacquer bath, preventing the lacquer from draining to and consequently accumulating on any part of its surface, also has the effect of distributing the lacquer evenly and results in a clean and neatly finished can. The air blast facilitates the work of drying to such an extent that it requires only about two minutes after being deposited on the drying bed of the machine for the cans to be ready for handling, while the quantity of cans which can be handled in a day is vastly greater than by the old method.

A few flat and oval cans are not lacquered, but are protected from rust by wrapping in tissue paper, over which the label is placed.

### LABELING.

While machines have been made for this purpose, and some of them are in use, the work is usually done by hand. A number of men

seat themselves about 4 feet apart in front of the pile of cans. Each man has in front of him a package of several hundred labels, and by bunching them on a slant so that successive margins protrude beyond each preceding, he can apply paste to the entire number with one stroke of the brush. A can is placed on the label, is quickly rolled, and the label is on much quicker than one can tell it. Each man places to his right the cans he labels, forming a pile of length and width equal to his unlabeled pile, and when the entire lot has been labeled it has been shifted only about 4 feet. Cans of fancy brands of salmon put up on the Columbia River and in the Puget Sound region are wrapped in colored tissue paper before the label is put on. Cartons similar to those used by the sardine packers would make good containers for fancy brands and would be much cheaper than the present method.

Several attempts have been made to popularize salmon packed in glass and porcelain jars, and while these have met with some favor, it was not sufficient to warrant a continuance of the practice for any length of time. None are being so packed at the present time.

### BRANDS.

A very important feature of the canning industry is the selection of appropriate brands or labels for the various grades of salmon. Each company has a number of these, which it has acquired either by designing them or by absorbing another company which owned them. A well-known brand has a value in itself and sometimes is a very important asset. A company will sometimes market a considerable part of its product in one section, and here, where the consumer has become familiar with the brand and pleased with the contents of the can, he will ask for and accept no other, despite the fact that the latter might be, and probably is, the equal of the product he has been using.

Up to a few years ago one of the most serious evils in the trade was the use of misleading and lying brands. The high-grade product would almost invariably be correctly and fully branded, but "chums" and "pinks" were usually branded as "Fresh salmon," "Choice salmon," etc., which would deceive all persons but those well acquainted with the industry. "Do-overs" and very poor fish were usually marketed under a brand which bore the name of a fictitious company or of no company at all.

The passage of State laws of varying degrees of efficiency governing the branding of salmon helped slightly to remedy this condition of affairs, but it was not until the Pure Food and Drugs Act, approved June 30, 1906, was put into force by the Government that any radical improvement was noticeable. At the present time but few misleading brands are in use.

### BOXING OR CASING.

A case of salmon generally contains 48 one-pound cans or their equivalent, i. e., 24 two-pound cans or 96 half-pound cans. Some canneries pack their half-pound cans in cases of 48. These cases are usually made of wood and cost from 9 to 11 cents each knocked down.

### CAN MAKING.

Some of the canneries in the coast States purchase their cans ready made, but the usual method is to purchase the sheet tin and make up the cans in the canneries. This is especially necessary in Alaska, as it would be impossible to find room on the cannery ships for such a bulk as they would make in addition to the other supplies necessary. Furthermore, the making of cans provides work for a large part of the crew, otherwise unemployed while the rest are getting ready the other necessary paraphernalia. The work is done by machinery and occupies several weeks' time.

### MILD CURING.

The beginning of the business of mild curing salmon, or "sweet pickling," as it is sometimes called, is of comparatively recent date.

In 1889 a German dealer came to the Columbia River and tried to interest some of the cannery men in the business. Messrs. J. O. Hanthorn, M. J. Kinney, and J. W. Cook were persuaded to prepare some, and the plant of the Northwest Cold Storage Company, at Portland, was used to keep the fish at a low temperature during repacking and preparation for shipment. These fish were shipped to Germany, but the shippers received no financial returns, word coming back that the fish were not satisfactory.

Owing to this lack of success from the first effort no further attempt was made until 1894, when Mueller & Loring, of Chicago, put up a carload of mild-cured salmon at Kalama, Wash., and shipped it to Germany. In 1896 Charles Ruckles and Wallace Brothers, of Kalama, packed several carloads for the German market. It was not until 1898 that the business was permanently established on the Columbia, the Trescott Packing Company and S. Schmidt & Sons putting up plants at Warrenton and Astoria, respectively.

In 1900 the Trescott Packing Company began packing the spring and fall runs, and the Sacramento River Packers' Association packed the fall run, on the Sacramento River, the business being carried on here every year since.

In 1901 the Sacramento River Packers' Association began at Monterey the mild curing of the spring salmon that were taken with hook and line in the open ocean.

S. Ellmore & Company started the industry in 1902 at Tillamook, and the business began on Puget Sound in 1901, when the San Juan Fishing & Packing Company and the Seattle Fish Company took it up.

Prior to 1906 several of the Alaska cannery men put up each season a few tierces of mild-cured salmon, but it was not until this time that the industry really began as such. In that year J. Lindenberger (Inc.) started packing at Ketchikan, Alaska. The following year several other plants were started, and in 1910 almost all of the king salmon taken in southeast Alaska were mild cured.

In mild curing the fish are split down the middle, the head, tail, and all fins except the pectorals removed, and the backbone cut out. The fish is then in two halves. Each of these halves, or sections, is then scored on the outside eight or nine times with the knife. They are then thrown into a cleaning vat, and here the inner side of each section is carefully scraped clear of blood and membrane with a knife, while the outside is thoroughly cleaned with a scrubbing brush. The sections are then laid carefully inner side up in another vat partly filled with clear, cold, running water, or into a tierce partly filled with fresh water and cracked ice, in which they remain for an hour. Formerly the fish were put into brine, but it has been found that ice water answers the purpose much better. After being thoroughly cooled, the sections are salted down in the tierces, each one being laid with its tail toward the center. Usually about 50 whole fish are required to fill a tierce. The fish are but lightly salted, and owing to this fact must be kept in cold storage until used.

In the early days of the industry different preparations, which included salicylic and boracic acids, were used to help preserve the fish. This caused much complaint from the Germans, and finally their Government subjected our product to a rigid inspection, with most salutary results, as now it is one of the purest and best products put up on this coast, the use of acids being done away with entirely.

The king salmon is almost invariably the species mild cured, being the only one large enough to answer the requirements of the trade. In 1907 a Ketchikan, Alaska, packer put up a quantity of coho, dog, and humpback salmon, but he found so much difficulty in disposing of the product that he abandoned further efforts in this line.

The principal consumers of the mild-cured salmon are the smokers, who take them from the tierce, wash them for a few minutes, and then have a practically fresh fish to smoke, and not, as in the days when hard-pickled salmon were used, one that had lost most of its oil and flavor through the excessive amount of salt needed to preserve it.

The greater part of the product put up on this coast goes to Europe, Germany being the principal consumer, but considerable quantities are sold in Norway, Sweden, and other countries, while the smokers of the cities east of the Rocky Mountains use large shipments every year.

### PICKLING.

The earliest method of preserving salmon on the coast was by pickling. At times this industry attained to large proportions, but during the last 10 years it has been declining, largely because of the increasing popularity of mild-cured salmon. All species of salmon are pickled, but the most popular is the red salmon.

In dressing salmon for pickling the heads are removed, the fish split along the belly, the cut ending with a downward curve on the tail. The viscera and two-thirds of the backbone are removed, and the blood, gurry, and black stomach membrane scraped away. The fish are then thoroughly scrubbed and washed in cold water. They are next placed in pickling butts with about 15 pounds of salt to every 100 pounds of fish. The fish remain here about one week, when they are removed, rubbed clean with a scrub brush, and repacked in market barrels, one sack of salt being used to every three barrels of 200 pounds each. About 40 to 52 red salmon, 25 to 35 coho salmon, 70 to 80 humpback salmon, 10 to 14 king salmon, and 25 to 30 dog salmon are required in packing a barrel of pickled salmon.

A few salteries also pack "bellies." This product is merely the belly of the fish, which is the fattest portion, and as most of the packers threw away the rest of the fish, thus causing a very large waste of choice food, this method has come under the ban of the law in some of the coast States and in Alaska. As a result but few "bellies" are packed now, and most of these only when some economic use is made of the remainder. Humpback salmon furnish the major part of the "belly" pack.

### DRY SALTING.

During the progress of the Russian-Japanese War the preparation of dry-salted dog salmon became an important industry, but as soon as the Japanese fishermen resumed their former occupations the demand fell off so much that the industry was virtually abandoned in the United States, although a number of Japanese continue it in British Columbia. The fish, after being dressed, were packed in boxes, in salt, these boxes holding about 560 pounds of fish, and were shipped in this condition to Japan.

At a number of places in Alaska the bellies of red and coho salmon are cut out and salted, after which the backs are dried in the sun and,

thus cured, are used for fox food at the numerous fox ranches. This product is called "ukalu."

## SMOKING.

The smoking of salmon is virtually a continuation of the pickling, as the fish must be pickled before being smoked, the main purpose of the pickling being to preserve them until the time arrives for smoking, which may be weeks or months after the fish are caught. For smoking them the salmon are taken out of the barrel and soaked until as much as possible of the salt is removed. They are then put into the smokehouses and subjected to the heat and smoke of a fairly hot fire for about two days in order that they may be thoroughly dried and hardened. Exposure to a smoldering fire (alderwood is a favorite fuel) for about three days completes the process.

For shipment smoked salmon are packed in wooden boxes, oil paper being placed between the fish.

A variation of the smoking process is known as "kippering." With this method the salmon are dried in a hot fire for about 20 hours and then smoked over another hot fire for about 24 hours. The "buckling" process is also similar to this.

Dog and king salmon are often cut into steaks and kippered. As the sale of white-meated king salmon is somewhat hampered by the whiteness, the smokers use a coloring preparation, known in the trade as Zanzibar carmine. This gives the outside of the fish a deep-colored red gloss, but leaves the inside its natural white color. The steaks are wrapped in paper and packed in baskets holding 10 pounds each.

A smoked product known locally as "beleke," is put up at Kodiak, Alaska, from red and coho salmon. Steelhead trout are the best for this purpose, but are not often utilized owing to their scarcity in this region. In preparing "beleke" only the backs of the fish are used, the belly part being cut out and pickled separately. The backs are divided into three grades, according to size, viz, "small," "medium," and "large." They are first put into a brine, the "large" being put in first, followed by the "medium" and "small" at intervals of 1 hour each, so that all will be cured at about the same time. The coho backs, being the largest, are kept in the brine from 19 to 20 hours, while the red salmon backs, which are smaller, remain in the brine only about 16 hours. After being thoroughly salted the backs are removed from the brine and rinsed in fresh water, then hung in the air for about 24 hours to dry and to allow a thin skin to form on the outside. They are then hung in the smokehouse, in the presence of a little fire of cottonwood or alder. On dry days the gable windows are thrown open and the wind allowed to

pass through while the smoking is going on. The smoking must be done slowly, two weeks being devoted to it.

There is a good demand for this product locally, the fish selling for from 15 to 20 cents a pair, but little effort has been made to extend its sale outside of central Alaska.

### FREEZING.

The process of preserving fish by freezing was first introduced in 1888. Previous to this the comparatively ancient method of packing with ice, or in rare instances letting the fish freeze naturally during the winter months, was followed. Packing with ice is in quite general use to-day for shipments of fish which are to be preserved for short periods of time. Cooling with ice never results in a temperature lower than 32° F., which, of course, does not freeze the fish.

The freezing of salmon and steelhead trout began on the Sacramento and Columbia Rivers in the late eighties. It was taken up in a small way on Puget Sound in 1892. That year Wallace Bros. and Ainsworth & Dunn froze a small lot, and the venture was so successful that the next year nearly all of the wholesale dealers on the Sound took up the business. In Alaska the preparing of frozen salmon began in 1902. The San Juan Fishing & Packing Company, soon to be succeeded by the Pacific Cold Storage Company, put up a cannery and cold-storage plant at Taku Harbor, in southeast Alaska, in 1901, though it did not operate the cold-storage portion until 1902. This is the only plant which has operated in Alaska, although the New England Fish Company erected in 1909 a large plant at Ketchikan for the freezing of halibut primarily, but will probably freeze salmon also.

The freezing of salmon is almost invariably carried on in connection with other methods of handling and preserving, and the purpose is usually to secure the fish when numerous and cheap, freeze them, and then hold them until the runs are over and the fish are once more in good demand at high prices. The business proved so profitable, however, that the dealers began to look for wider markets for their product. Europe, more especially Germany, was prospected and a profitable market soon delevoped, with the result that to-day frozen Pacific salmon can be secured in nearly every town of any size in western Europe, while large quantities are marketed all over our own country.

There are four important features in packing and using frozen salmon: (1) To get fresh fish; (2) to keep them cold (about 15° above zero) after they are frozen; (3) to keep a coat of ice on them, and (4) to allow them to thaw slowly in cold water before cooking.

In selecting salmon for freezing only the finest and freshest of each species are used. The current belief that freezing destroys the flavor of the fish is erroneous, the flavor depending entirely upon the condition before freezing, and the quicker they are frozen after being caught the better will the natural flavor of the fish be preserved. Frozen salmon are just as wholesome as fresh, and their chemical constituents are almost identical. The danger lies in the temptation to freeze the fish after decomposition has set in, but, fortunately, this is now very rarely practiced in the salmon industry.

The coho, or silver, and the chum, or dog, salmon are the choicest of the salmons for freezing. The other species except the red, or sockeye, which is too oily and rarely frozen, are also frozen in varying quantities. The steelhead trout, which is ranked by the Pacific coast dealers among the salmon, is considered the choicest fish of all for freezing.

One of the most modern plants on the coast—that of the New England Fish Company, at Ketchikan, Alaska—has four freezers, each 25 feet by 10 feet 6 inches, in which a temperature of from 25° to 30° F. below zero can be maintained if desired, although a temperature of more than 10° below zero is rarely ever required. All freezing is by direct expansion and each freezer is piped with about 2 feet of 1¼-inch pipe per cubic foot of freezing space. The bunkers in the freezers are in pairs, each nine pipes wide, spaced 10 inches apart. This leaves a 3½-foot passage through the center of each freezer opposite the 3½ by 6½ foot swing doors. The salmon are laid on pans, which are placed on the tiers of pipes.

After freezing, the salmon are passed through openings in the rear of the freezers into the glazing room, which has a temperature of about 20°F., where they are dipped into water, and when removed are covered with a thin glaze of ice, which may be thickened by repeated dippings. This is an extra precaution to exclude the air from the fish.

After being thoroughly frozen and glazed, each fish is covered first with a parchment, like rolls of butter, and then with a piece of heavy brown paper. They are then packed in boxes holding about 250 pounds each, placed in the cold-storage cars and shipped.

## MISCELLANEOUS PRODUCTS.

A few years ago a company on the Columbia River put up what was known as "fish pudding." In preparing this the salmon was ground fine, mixed with milk and eggs, and then packed in tin cans. The preparation was soon abandoned.

In 1903 one of the Point Roberts canneries packed a new product which was called "salmon paste." For this the fish was ground up,

cooked, seasoned with spices, etc., and made into fish balls, a very palatable dish when warmed over.

In 1905 a Seattle concern began the manufacture of wienerwurst sausages from halibut and salmon.

The Indians in the Bristol Bay region of Alaska occasionally dress the skins of salmon and make of them leather for the tops of boots, also bags and other small articles.

Every year immense quantities of salmon roe are thrown away in the fisheries of the west coast, though there is but little doubt that, if properly prepared, a market could be found for this now waste part of the fish. In France there is a good market for a product known as "rogue," which is the spawn of cod, haddock, hake, and pollock salted in casks, and which is used as bait in the sardine fisheries. Salmon spawn is the choicest and most successful bait used on this coast, and if properly prepared would undoubtedly answer the purpose as well, if not better, owing to its oiliness and attractive color, than the regular "rogue." The roes should be soaked for some days in old brine and then packed in strong casks holding about 25 gallons each. It might also prove to be a good bait for tolling mackerel on the Atlantic coast.

In 1910 a considerable quantity of salmon roe was prepared in Siberia and sold in competition with caviar, which is prepared from sturgeon eggs. The product met with favor in Europe and several Alaska firms are preparing to put it up in 1912. It should be prepared in the same manner as caviar.

Several establishments are putting up these eggs in jars and hermetically sealed cans for use as bait in sport fishing.

A product which was first made in Norway is prepared by means of an invention which quickly dries and pulverizes the flesh of fresh fish. The resulting powder, called "fish flour," is easy to transport from one place to another and has great nutritive value. It is probable that the tailpieces of the fish, which are at present thrown away, and the cheaper grades of salmon might be prepared in this way and thus furnish another market for salmon.

## OIL AND FERTILIZER.

As early as 1888 there was a small plant at Astoria, Oreg., where the refuse of the canneries was utilized for the manufacture of oil and fertilizer. In that year 8,000 gallons of oil (chiefly from salmon heads), and 90 tons of fertilizer were prepared. The oil was worth 22½ cents per gallon and the fertilizer had a market value of $20 per ton. Most of the refuse was dumped into the river, however. In 1898 a similar plant was established in the Puget Sound district

of Washington, but for some reason the industry has languished almost from the start.

In 1882 the Alaska Oil & Guano Company established a fertilizer plant at Killisnoo, Alaska, for the extraction of oil and fertilizer from herring, and has operated the plant continuously ever since. In some years large quantities of whole salmon have been handled at this plant, and the resulting product was found to sell as well as that from herring.

Probably the most serious evil in the salmon industry to-day is the enormous wastage which annually occurs. About one-fourth of the total weight of each fish handled at the various packing plants is thrown away. With the exception of the tailpiece, which is discarded at most canneries owing to the excessive amount of bone which would be in the product if canned, this waste material could not be utilized as food, comprising as it does the head, viscera, fins, and tail. When not conveniently near the very few fertilizer plants at present in operation this product is either allowed to pass through chutes into the water under the cannery, or is dumped into scows and towed to the ocean or the deeper waters of the sounds, and here thrown overboard. This procedure, not only exceedingly wasteful, is also far from beneficial to the waters where deposited.

The great desideratum in the salmon fisheries of the Pacific coast at the present time is the invention of a small odorless-fertilizer plant, costing not more than $2,500 or $3,000, which can be installed at the various salmon canneries and salteries. The offal from the cannery could there be utilized and the product obtained would doubtless net a fair return on such an investment, while at the same time the present (in the aggregate) enormous waste would be stopped, and the waters adjacent to the canneries rendered far more agreeable to the fishes as well as to the people on shore. It is absolutely essential that the plant shall be odorless, as the smell of the ordinary fertilizer establishment would be very offensive to persons visiting the cannery and would not enhance the demand for canned salmon. At the present time the cheapest plant available costs about $10,000, and very few canneries can afford to invest this sum of money in the disposal of their own offal alone.

## VII. STATISTICS OF THE PACIFIC SALMON INDUSTRY IN 1909.

This is the first report in which detailed statistics of the salmon fisheries of Washington, Oregon, California, and Alaska have been shown for the same year. Partial statistics of British Columbia and Yukon Territory of the Dominion of Canada are also included.

### PERSONS EMPLOYED.

The large army of 28,945 men, women, and children were employed in the salmon fisheries of Alaska and the three coast States. Alaska leads with 11,433, followed by Washington, Oregon, and California in the order named. Over two-thirds of the grand total is made up of whites. The Chinese and Japanese have almost the same number, while 2,803 Indians were employed.

PERSONS ENGAGED IN THE SALMON FISHERIES OF THE PACIFIC COAST STATES AND ALASKA IN 1909.

| Occupation and race. | Alaska. | Washington. | Oregon. | California. | Total. |
|---|---|---|---|---|---|
| Fishermen: | | | | | |
| Whites | 2,486 | 4,426 | 4,179 | 2,114 | 13,205 |
| Indians | 1,176 | 221 | ..... | ..... | 1,397 |
| Chinese | ..... | ..... | ..... | 15 | 15 |
| Japanese | 13 | ..... | ..... | 168 | 181 |
| Total | 3,675 | 4,647 | 4,179 | 2,297 | 14,798 |
| Shoresmen: | | | | | |
| Whites | 1,911 | 2,091 | 404 | 276 | 4,682 |
| Indians | 1,246 | 115 | ..... | 15 | 1,376 |
| Chinese | 1,992 | 1,270 | 411 | ..... | 3,673 |
| Japanese | 2,136 | 1,102 | 256 | 5 | 3,499 |
| Total | 7,285 | 4,578 | 1,071 | 296 | 13,230 |
| Transporters: | | | | | |
| Whites | 443 | 292 | 70 | 82 | 887 |
| Indians | 30 | ..... | ..... | ..... | 30 |
| Total | 473 | 292 | 70 | 82 | 917 |
| Total: | | | | | |
| Whites | 4,840 | 6,809 | 4,653 | 2,472 | 18,774 |
| Indians | 2,452 | 336 | ..... | 15 | 2,803 |
| Chinese | 1,992 | 1,270 | 411 | 15 | 3,688 |
| Japanese | 2,149 | 1,102 | 256 | 173 | 3,680 |
| Grand total | 11,433 | 9,517 | 5,320 | 2,675 | 28,945 |

### INVESTMENT.

The total investment in the salmon fisheries was $25,157,813, of which Alaska furnishes more than one-half. Gill nets are the principal form of apparatus in use, followed by stationary traps, or pounds, diver nets, haul seines, purse seines, etc.

## Investment in the Salmon Fisheries of the Pacific Coast States and Alaska in 1909.

| Items. | Alaska. | | Washington. | | Oregon. | |
|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | |
| Power vessels | 133 | $1,067,944 | 93 | $440,500 | 30 | $119,900 |
| Tonnage | 5,891 | | 1,158 | | 288 | |
| Outfit | | 266,986 | | 135,625 | | 25,350 |
| Sailing vessels | 43 | 1,085,400 | | | | |
| Tonnage | 59,761 | | | | | |
| Outfit | | 108,540 | | | | |
| Power boats | 17 | 24,840 | 5 | 3,950 | 15 | 28,900 |
| Fishing boats, power | 60 | 30,000 | 464 | 472,650 | 287 | 139,600 |
| Fishing boats, sail and row | 1,821 | 211,671 | 2,244 | 128,945 | 1,890 | 224,545 |
| Scows and house boats | 310 | 171,005 | 398 | 168,673 | 114 | 45,050 |
| Pile drivers | 43 | 90,555 | 62 | 124,350 | 2 | 1,800 |
| Apparatus, shore fisheries: | | | | | | |
| Purse seines | 98 | 27,188 | 101 | 44,150 | | |
| Haul seines | 94 | 27,731 | 246 | 28,955 | 48 | 16,280 |
| Gill nets, drift | 1,209 | 111,756 | 1,620 | 168,831 | 2,818 | 523,331 |
| Gill nets, set | | | 1,624 | 37,259 | 1,122 | 27,614 |
| Diver nets | | | 48 | 10,160 | 418 | 22,375 |
| Traps, stationary | 73 | 130,794 | 525 | 1,324,968 | 21 | 25,750 |
| Traps, floating | 15 | 21,250 | 1 | 2,000 | | |
| Reef nets | | | 9 | 4,500 | | |
| Wheels, stationary | | | 13 | 76,000 | 26 | 313,000 |
| Wheels, scow | | | 3 | 8,500 | 9 | 22,000 |
| Spears | 20 | 30 | | | | |
| Lines, trolling | | 523 | | 261 | | |
| Lines, hand | | | | | | |
| Shore and accessory property | | 5,601,259 | | 1,730,030 | | 1,554,780 |
| Cash capital | | 4,970,799 | | 1,424,500 | | 551,500 |
| Total | | 13,948,271 | | 6,334,807 | | 3,641,775 |

| Items. | California. | | Total. | |
|---|---|---|---|---|
| | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | |
| Power vessels | 4 | $37,748 | 260 | $1,666,092 |
| Tonnage | 56 | | 7,393 | |
| Outfit | | 3,920 | | 431,881 |
| Sailing vessels | | | 43 | 1,085,400 |
| Tonnage | | | 59,761 | |
| Outfit | | | | 108,540 |
| Power boats | 41 | 63,300 | 78 | 120,990 |
| Fishing boats, power | 171 | 91,050 | 982 | 733,300 |
| Fishing boats, sail and row | 1,158 | 128,245 | 7,113 | 693,406 |
| Scows and house boats | 50 | 13,925 | 872 | 398,653 |
| Pile drivers | | | 107 | 216,705 |
| Apparatus, shore fisheries: | | | | |
| Purse seines | | | [a] 199 | 71,338 |
| Haul seines | 47 | 5,650 | [b] 435 | 78,616 |
| Gill nets, drift | 1,086 | 167,570 | [c] 6,733 | 971,488 |
| Gill nets, set | | | [d] 2,746 | 64,873 |
| Diver nets | | | [e] 466 | 32,535 |
| Traps, stationary | | | 619 | 1,481,512 |
| Traps, floating | | | 16 | 23,250 |
| Reef nets | | | 9 | 4,500 |
| Wheels, stationary | | | 39 | 389,000 |
| Wheels, scow | | | 12 | 30,500 |
| Spears | | | 20 | 30 |
| Lines, trolling | | 1,149 | | 1,933 |
| Lines, hand | | 10 | | 10 |
| Shore and accessory property | | 497,393 | | 9,383,462 |
| Cash capital | | 223,000 | | 7,169,799 |
| Total | | 1,232,960 | | 25,157,813 |

[a] Aggregate length of 104,570 yards.
[b] Aggregate length of 111,558 yards.
[c] Aggregate length of 2,356,847 yards.
[d] Aggregate length of 151,655 yards.
[e] Aggregate length of 65,800 yards.

## PRODUCTS.

The total products amount to 365,336,482 pounds, which returned the fishermen $7,224,024. Bluebacks, sockeyes, or red salmon were most numerous in Alaska and Washington, chinooks in California, coho or silver, dog or chum, and steelhead trout in Washington, while humpbacks were taken commercially in Alaska and Washington alone, being especially numerous in Alaska.

PRODUCTS OF THE SALMON FISHERIES OF ALASKA AND THE PACIFIC COAST STATES IN 1909.

| Species. | Alaska. | | Washington. | | Oregon. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Blueback, sockeye or red | 116,014,486 | $1,029,079 | 77,280,989 | $2,835,666 | 844,324 | $34,703 |
| Chinook, king or spring | 8,959,544 | 151,984 | 11,016,476 | 604,906 | 13,952,814 | 736,456 |
| Coho, silver or white | 3,526,404 | 41,233 | 21,328,466 | 554,157 | 5,184,520 | 127,204 |
| Dog or chum | 9,456,048 | 15,583 | 25,520,426 | 164,300 | 699,348 | 3,818 |
| Humpback or pink | 37,965,928 | 95,065 | 17,495,586 | 46,187 | ..... | ..... |
| Steelhead trout | 11,650 | 400 | 2,427,251 | 130,486 | 1,510,285 | 66,802 |
| Total | 175,934,060 | 1,333,344 | 155,069,194 | 4,335,702 | 22,191,291 | 968,983 |

| Species. | California. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Blueback, sockeye or red | 21,000 | $689 | 194,160,799 | $3,900,137 |
| Chinook, king or spring | 11,962,248 | 580,094 | 45,891,082 | 2,073,440 |
| Coho, silver or white | 145,500 | 4,575 | 30,184,890 | 727,169 |
| Dog or chum | 4,200 | 84 | 35,680,022 | 183,785 |
| Humpback or pink | ..... | ..... | 55,461,514 | 141,252 |
| Steelhead trout | 8,989 | 553 | 3,958,175 | 198,241 |
| Total | 12,141,937 | 585,995 | 365,336,482 | 7,224,024 |

NOTE.—In addition to the above, British Columbia produced 89,852,089 pounds, which returned the fishermen $1,832,573, and the Yukon Territory (Yukon River), 80,565 pounds, which returned the white fishermen $10,209.

## PRODUCTS CANNED.

In order to show the total pack of the Pacific coast of the North American Continent, the pack of British Columbia has been included. The total pack reduced to a common basis of forty-eight 1-pound cans amounted to 5,392,306½ cases, valued at $25,518,669. Alaska leads in the total pack, with Washington second. Alaska also leads in the pack of sockeyes, humpbacks, and chums. Washington leads in the pack of cohoes and Oregon in the pack of chinooks and steelhead trout.

SALMON CANNED IN ALASKA, BRITISH COLUMBIA, WASHINGTON, OREGON, AND CALIFORNIA IN 1909.

| Products. | Alaska. | | British Columbia. | | Washington. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Chinook, king, or spring: | | | | | | |
| ½-pound flat | | | 360 | $1,440 | 23,550 | $98,780 |
| 1-pound flat | | | 1,214 | 7,314 | 40,730 | 268,849 |
| 1-pound flat exports | | | | | 606 | 4,242 |
| ½-pound tall | | | 176 | 516 | | |
| 1-pound tall | 48,034 | $207,624 | 17,613 | 94,110 | 21,426 | 116,593 |
| ½-pound oval | | | | | | |
| 1-pound oval | | | 444 | 2,886 | 1,110 | 10,212 |
| 2-pound nominal | | | | | | |
| Total | 48,034 | 207,624 | 19,807 | 106,266 | 87,422 | 498,676 |
| Coho, silver, or silverside: | | | | | | |
| ½-pound flat | | | 2,132 | 5,969 | 34,292 | 94,417 |
| 1-pound flat | 1,206 | 5,543 | 5,911 | 28,373 | 28,885 | 134,755 |
| 1-pound tall | 55,350 | 225,486 | 61,520 | 258,400 | 137,008 | 570,030 |
| 2-pound nominal | | | | | 427 | 2,562 |
| Total | 56,556 | 231,029 | 69,563 | 292,742 | 200,612 | 801,764 |
| Chum, or dog: | | | | | | |
| ½-pound flat | | | | | 1,300 | 1,950 |
| 1-pound flat | | | | | 219 | 591 |
| 1-pound tall | 120,712 | 274,110 | 16,573 | 39,775 | 83,664 | 197,932 |
| Total | 120,712 | 274,110 | 16,573 | 39,775 | 85,183 | 200,473 |
| Humpback, or pink: | | | | | | |
| 1-pound flat | | | 2,267 | 6,234 | 2,030 | 5,585 |
| 1-pound tall | 464,873 | 1,114,839 | 27,722 | 66,581 | 368,963 | 896,757 |
| Total | 464,873 | 1,114,839 | 29,989 | 72,815 | 370,993 | 902,342 |
| Sockeye, blueback, or red: | | | | | | |
| ½-pound flat | 16,385 | 63,888 | 483,760 | 1,935,040 | 229,502 | 927,967 |
| 1-pound flat | 85,193 | 236,609 | 314,706 | 1,888,236 | 456,712 | 2,746,667 |
| ½-pound tall | | | 12,880 | 42,504 | | |
| 1-pound tall | 1,611,916 | 7,310,053 | 277,893 | 1,500,623 | 487,479 | 2,558,993 |
| ½-pound oval | | | 17,650 | 75,013 | | |
| 1-pound oval | | | 406 | 2,639 | | |
| 1-pound squats | | | 8,312 | 49,872 | | |
| Total | 1,713,494 | 7,610,550 | 1,115,607 | 5,493,927 | 1,173,693 | 6,233,627 |
| Steelhead trout: | | | | | | |
| ½-pound flat | | | | | 945 | 2,937 |
| 1-pound flat | | | | | 3,794 | 19,422 |
| 1-pound tall | | | | | 3,897 | 22,602 |
| Total | | | | | 8,636 | 44,961 |
| Grand total | 2,403,669 | 9,438,152 | 1,251,539 | 6,005,525 | 1,926,539 | 8,681,843 |

SALMON CANNED IN ALASKA, BRITISH COLUMBIA, WASHINGTON, OREGON, AND CALIFORNIA IN 1909—Continued.

| Products. | Oregon. | | California. | | Total. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Chinook, king, or spring: | | | | | | |
| ½-pound flat | 69,557 | $289,534 | | | 93,467 | $389,754 |
| 1-pound flat | 54,591 | 396,809 | 5,663 | $28,315 | 102,198 | 701,287 |
| 1-pound flat exports | | | | | 606 | 4,242 |
| ½-pound tall | | | | | 176 | 516 |
| 1-pound tall | 23,057 | 148,815 | | | 110,130 | 567,142 |
| ½-pound oval | 534 | 2,670 | | | 534 | 2,670 |
| 1-pound oval | 848 | 8,242 | | | 2,402 | 21,340 |
| 2-pound nominal | 458 | 1,833 | | | 458 | 1,833 |
| Total | 149,045 | 847,903 | 5,663 | 28,315 | 309,971 | 1,688,784 |
| Coho, silver, or silverside: | | | | | | |
| ½-pound flat | 20,331 | 56,928 | | | 56,755 | 157,314 |
| 1-pound flat | 11,755 | 51,702 | | | 47,757 | 220,373 |
| 1-pound tall | 39,326 | 157,886 | | | 293,204 | 1,211,802 |
| 2-pound nominal | 315 | 945 | | | 742 | 3,507 |
| Total | 71,727 | 267,461 | | | 398,458 | 1,592,996 |
| Chum, or dog: | | | | | | |
| ½-pound flat | | | | | 1,300 | 1,950 |
| 1-pound flat | | | | | 219 | 591 |
| 1-pound tall | 9,225 | 21,218 | | | 230,174 | 533,035 |
| Total | 9,225 | 21,218 | | | 231,693 | 535,576 |
| Humpback, or pink: | | | | | | |
| 1-pound flat | | | | | 4,297 | 11,819 |
| 1-pound tall | 55 | 132 | | | 861,613 | 2,078,309 |
| Total | 55 | 132 | | | 865,910 | 2,090,128 |
| Sockeye, blueback, or red: | | | | | | |
| ½-pound flat | 32,071 | 133,095 | | | 761,718 | 3,059,990 |
| 1-pound flat | 6,645 | 39,870 | | | 863,256 | 4,911,382 |
| ½-pound tall | | | | | 12,880 | 42,504 |
| 1-pound tall | 50 | 320 | | | 2,377,338 | 11,369,989 |
| ½-pound oval | | | | | 17,650 | 75,013 |
| 1-pound oval | | | | | 406 | 2,639 |
| 1-pound squats | | | | | 8,312 | 49,872 |
| Total | 38,766 | 173,285 | | | 4,041,560 | 19,511,389 |
| Steelhead trout: | | | | | | |
| ½-pound flat | 7,064 | 22,084 | | | 8,009 | 25,021 |
| 1-pound flat | 1,365 | 7,695 | | | 5,159 | 27,117 |
| 1-pound tall | 4,320 | 25,056 | | | 8,217 | 47,658 |
| Total | 12,749 | 54,835 | | | 21,385 | 99,796 |
| Grand total | 281,567 | 1,364,834 | 5,663 | 28,315 | [a] 5,868,977 | 25,518,669 |

[a] All 1-pound cases contain forty-eight 1-pound cans; the ½-pound cases contain forty-eight ½-pound cans. Reduced to a common basis of cases containing forty-eight 1-pound cans, the aggregate pack amounts to 5,392,306½ cases.

## MISCELLANEOUS PRODUCTS.

The total miscellaneous secondary products prepared amounted to 29,808,129 pounds, valued at $2,096,030. Of these the largest quantity and value is represented in the mild-cured pack. The pickled pack is second in quantity but is exceeded in value by the frozen pack. Alaska leads Washington very slightly in the quantity of products prepared, but both are exceeded in value of products by Oregon.

MISCELLANEOUS SECONDARY PRODUCTS PREPARED IN ALASKA AND THE PACIFIC COAST STATES IN 1909.

| Products. | Alaska. | | Washington. | | Oregon. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | | | |
| Chinook, king, or spring | | | 74,183 | $7,418 | 14,000 | $1,400 |
| Coho, silver, or silverside | 35,721 | $1,072 | 528,477 | 30,149 | 216,175 | 13,868 |
| Dog, or chum | 77,882 | 1,558 | 1,364,672 | 67,161 | | |
| Humpback, or pink | | | 62,945 | 1,888 | | |
| Steelhead trout | 9,450 | 473 | 504,165 | 46,615 | 1,446,685 | 144,658 |
| Total | 123,053 | 3,103 | 2,534,442 | 153,231 | 1,676,860 | 159,926 |
| Mild-cured: | | | | | | |
| Chinook, king, or spring | 1,833,600 | 149,300 | 2,292,800 | 273,826 | 4,365,442 | 434,825 |
| Pickled: | | | | | | |
| Chinook, king, or spring | 88,200 | 3,798 | 1,000 | 540 | 400 | 24 |
| Chinook bellies | 7,000 | 175 | 6,750 | 671 | | |
| Coho, silver, or silverside | 63,600 | 2,485 | | | 2,600 | 130 |
| Coho bellies | 227,750 | 3,843 | | | | |
| Dog, or chum | 7,000 | 190 | 50,000 | 175 | | |
| Humpback, or pink | 311,400 | 9,405 | 1,615,000 | 48,450 | | |
| Humpback backs | 11,200 | 224 | | | | |
| Humpback bellies | 169,480 | 7,396 | 172,400 | 8,620 | | |
| Sockeye, blueback, or red | 5,301,500 | 167,298 | | | | |
| Sockeye bellies | 783,600 | 13,902 | | | | |
| Total | 6,970,730 | 208,716 | 1,845,150 | 58,456 | 3,000 | 154 |
| Dry-salted and dried: | | | | | | |
| Chinook, king, or spring | 800 | 45 | | | | |
| Coho, silver, or silverside, backs | 14,500 | 549 | | | | |
| Dog, or chum | 71,600 | 1,038 | | | | |
| Humpback backs | 51,500 | 545 | | | | |
| Sockeye, blueback, or red, backs | 83,000 | 2,302 | | | | |
| Total | 221,400 | 4,479 | | | | |
| Smoked: | | | | | | |
| Chinook, king, or spring | | | 30,165 | 2,413 | 127,700 | 19,155 |
| Chinook, white-meated, kippered | | | 190,500 | 16,050 | | |
| Coho, silver, or silverside | | | 30,000 | 1,800 | 20,000 | 2,000 |
| Coho backs | 4,000 | 400 | | | | |
| Dog, or chum | 585 | 43 | 517,245 | 25,862 | | |
| Dog, kippered | | | 5,000 | 500 | | |
| Humpback backs, kippered | | | 100,000 | 5,000 | | |
| Sockeye, blueback, or red, backs | 40,300 | 2,780 | | | | |
| Total | 44,885 | 3,223 | 872,910 | 51,625 | 147,700 | 21,155 |
| Fertilizer | 159,224 | 2,287 | 1,210,000 | 18,610 | | |
| Oil | 120,113 | 3,216 | 380,648 | 14,161 | | |
| Grand total | 9,473,005 | 374,324 | 9,135,950 | 569,909 | 6,193,002 | 616,060 |

MISCELLANEOUS SECONDARY PRODUCTS PREPARED IN ALASKA AND THE PACIFIC COAST STATES IN 1909—Continued.

| Products. | California. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | |
| Chinook, king, or spring | | | 88,183 | $8,818 |
| Coho, silver, or silverside | | | 780,373 | 45,089 |
| Dog, or chum | | | 1,442,554 | 68,719 |
| Humpback, or pink | | | 62,945 | 1,888 |
| Steelhead trout | | | 1,960,300 | 191,746 |
| Total | | | 4,334,355 | 316,260 |
| Mild-cured: | | | | |
| Chinook, king, or spring | 4,887,962 | $520,468 | 13,379,804 | 1,378,419 |
| Pickled: | | | | |
| Chinook, king, or spring | | | 89,600 | 4,362 |
| Chinook bellies | | | 13,750 | 846 |
| Coho, silver, or silverside | | | 66,200 | 2,615 |
| Coho bellies | | | 227,750 | 3,843 |
| Dog, or chum | | | 57,000 | 365 |
| Humpback, or pink | | | 1,926,400 | 57,855 |
| Humpback backs | | | 11,200 | 224 |
| Humpback bellies | | | 341,880 | 16,016 |
| Sockeye, blueback, or red | | | 5,301,500 | 167,298 |
| Sockeye bellies | | | 783,600 | 13,902 |
| Total | | | 8,818,880 | 267,326 |
| Dry-salted and dried: | | | | |
| Chinook, king, or spring | | | 800 | 45 |
| Coho, silver, or silverside backs | | | 14,500 | 549 |
| Dog, or chum | | | 71,600 | 1,038 |
| Humpback backs | | | 51,500 | 545 |
| Sockeye, blueback, or red, backs | | | 83,000 | 2,302 |
| Total | | | 221,400 | 4,479 |
| Smoked: | | | | |
| Chinook, king, or spring | 110,550 | 14,643 | 268,415 | 36,211 |
| Chinook, white-meated, kippered | | | 190,500 | 16,050 |
| Coho, silver or silverside | 7,660 | 626 | 57,660 | 4,426 |
| Coho backs | | | 4,000 | 400 |
| Dog, or chum | | | 517,830 | 25,905 |
| Dog, kippered | | | 5,000 | 500 |
| Humpback backs, kippered | | | 100,000 | 5,000 |
| Sockeye, blueback, or red, backs | | | 40,300 | 2,780 |
| Total | 118,210 | 15,269 | 1,183,705 | 91,272 |
| Fertilizer | | | 1,369,224 | 20,897 |
| Oil | | | [a] 500,761 | 17,377 |
| Grand total | 5,006,172 | 535,737 | 29,808,129 | 2,096,030 |

[a] Represents 66,728 gallons.

## WASHINGTON.

Owing to the quadrennially heavy run of sockeye salmon and the biennial run of humpback salmon into Puget Sound occurring in 1909, the catch of both species of salmon was very heavy. The purse seiners made exceptionally heavy catches of sockeye salmon, while the traps had so many humpbacks in them that the greater part were turned out, it being impossible to find a market for them. In many places people were allowed to take away with them, free of charge, as many humpbacks as they wished.

In Grays Harbor the run of salmon was fairly good. On the Quiniault River the Indians made very successful catches. Early in the season a meeting of the tribe was held, and it was decided that a

50-foot runway in the center of the stream should be kept clear of nets so as to allow the fish an opportunity to reach the spawning beds in the lake.

In Willapa Harbor the run was fair.

On the Columbia River the catch was not as large as in 1908, which was due partly to the shortening of the open fishing season.

## STATISTICS BY COUNTIES.

*Persons employed.*—The total number of persons employed was 9,517, of which the large majority were whites.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF WASHINGTON, BY COUNTIES AND NATIONALITIES, IN 1909.

| Counties. | Fishermen. | | | Shoresmen. | | | | |
|---|---|---|---|---|---|---|---|---|
| | Whites. | Indians. | Total. | Whites. | Chinese. | Japanese. | Indians. | Total. |
| Whatcom | 643 | | 643 | 1,056 | 631 | 488 | 55 | 2,230 |
| San Juan | 193 | 12 | 205 | 42 | 40 | 40 | | 122 |
| Skagit | 303 | | 303 | 569 | 290 | 414 | 40 | 1,313 |
| Island | 273 | | 273 | 2 | | | | 2 |
| Snohomish | 284 | | 284 | 6 | | | | 6 |
| King | 527 | | 527 | 55 | | | | 55 |
| Pierce | 276 | | 276 | 12 | | | | 12 |
| Thurston | 50 | | 50 | | | | | |
| Mason | 67 | | 67 | | | | | |
| Kitsap | 241 | | 241 | | | | | |
| Clallam | 56 | 176 | 232 | 63 | 20 | 12 | | 95 |
| Jefferson | 68 | | 68 | 163 | 70 | 50 | 20 | 303 |
| Chehalis | 112 | 33 | 145 | 16 | 45 | 15 | | 76 |
| Pacific | 616 | | 616 | 18 | 40 | 20 | | 78 |
| Wahkiakum | 533 | | 533 | 80 | 134 | 63 | | 277 |
| Cowlitz | 61 | | 61 | 6 | | | | 6 |
| Clarke | 13 | | 13 | | | | | |
| Skamania | 82 | | 82 | 2 | | | | 2 |
| Klickitat | 28 | | 28 | 1 | | | | 1 |
| Total | 4,426 | 221 | 4,647 | 2,091 | 1,270 | 1,102 | 115 | 4,578 |

| Counties. | Transporters. | Total employed. | | | | Grand total. |
|---|---|---|---|---|---|---|
| | Whites. | Whites. | Chinese. | Japanese. | Indians. | |
| Whatcom | 129 | 1,828 | 631 | 488 | 55 | 3,002 |
| San Juan | 9 | 244 | 40 | 40 | 12 | 336 |
| Skagit | 75 | 947 | 290 | 414 | 40 | 1,691 |
| Island | | 275 | | | | 275 |
| Snohomish | | 290 | | | | 290 |
| King | 19 | 601 | | | | 601 |
| Pierce | 2 | 290 | | | | 290 |
| Thurston | | 50 | | | | 50 |
| Mason | | 67 | | | | 67 |
| Kitsap | | 241 | | | | 241 |
| Clallam | 6 | 125 | 20 | 12 | 176 | 333 |
| Jefferson | 12 | 243 | 70 | 50 | 20 | 383 |
| Chehalis | 3 | 131 | 45 | 15 | 33 | 224 |
| Pacific | 11 | 645 | 40 | 20 | | 705 |
| Wahkiakum | 25 | 638 | 134 | 63 | | 835 |
| Cowlitz | 1 | 68 | | | | 68 |
| Clarke | | 13 | | | | 13 |
| Skamania | | 84 | | | | 84 |
| Klickitat | | 29 | | | | 29 |
| Total | 292 | 6,809 | 1,270 | 1,102 | 336 | 9,517 |

*Investment, apparatus, etc.*—The total investment in the fisheries amounted to $6,334,807. Whatcom County has the largest investment, nearly one-third of the total.

INVESTMENT IN THE SALMON FISHERIES OF WASHINGTON, BY COUNTIES, IN 1909.

| Items. | Whatcom. | | San Juan. | | Skagit. | | Island. | | Snohomish. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 36 | $192,500 | 3 | $15,500 | 18 | $108,900 | ..... | ..... | ..... | ..... |
| Tonnage | 517 | ..... | 48 | ..... | 293 | ..... | ..... | ..... | ..... | ..... |
| Outfit | ..... | 60,500 | ..... | 4,600 | ..... | 32,400 | ..... | ..... | ..... | ..... |
| Fishing boats, power | 40 | 59,850 | 8 | 21,250 | 43 | 37,250 | 22 | $13,900 | 26 | $16,400 |
| Fishing boats, sail and row | 247 | 8,210 | 73 | 3,190 | 207 | 7,410 | 85 | 3,210 | 203 | 6,380 |
| Scows and house boats | 188 | 101,350 | 47 | 15,833 | 31 | 9,150 | 63 | 18,200 | 17 | 3,800 |
| Pile drivers | 13 | 61,000 | 5 | 23,600 | ..... | ..... | 2 | 9,000 | ..... | ..... |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Purse seines | 9 | 3,900 | 7 | 2,550 | 4 | 1,500 | 1 | 500 | 4 | 1,000 |
| Haul seines | 9 | 1,100 | ..... | ..... | 17 | 1,285 | 27 | 2,010 | 20 | 3,005 |
| Gill nets, drift | 71 | 12,250 | 3 | 225 | 338 | 26,270 | 1 | 300 | 130 | 1,036 |
| Gill nets, set | 96 | 6,200 | 18 | 310 | 336 | 5,700 | 1 | 10 | 537 | 6,317 |
| Trap nets, stationary | 72 | 372,540 | 23 | 116,178 | 12 | 46,500 | 29 | 176,500 | 8 | 35,000 |
| Reef nets | 2 | 1,000 | 7 | 3,500 | ..... | ..... | ..... | ..... | ..... | ..... |
| Lines, trolling | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 15 |
| Shore and accessory property | ..... | 600,003 | ..... | 37,350 | ..... | 382,044 | ..... | 5,250 | ..... | 6,245 |
| Cash capital | ..... | 679,000 | ..... | 45,000 | ..... | 309,000 | ..... | ..... | ..... | ..... |
| Total | ..... | 2,159,403 | ..... | 289,086 | ..... | 967,409 | ..... | 228,880 | ..... | 79,198 |

| Items. | King. | | Pierce. | | Thurston. | | Mason. | | Kitsap. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 7 | $23,300 | 1 | $2,500 | ..... | ..... | ..... | ..... | ..... | ..... |
| Tonnage | 56 | ..... | 5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Outfit | ..... | 11,400 | ..... | 800 | ..... | ..... | ..... | ..... | ..... | ..... |
| Power boats | ..... | ..... | 1 | 200 | ..... | ..... | ..... | ..... | ..... | ..... |
| Fishing boats, power | 60 | 107,900 | 23 | 60,200 | 1 | $2,500 | 4 | $3,800 | 26 | $36,900 |
| Fishing boats, sail and row | 234 | 7,350 | 88 | 3,300 | 27 | 880 | 29 | 1,310 | 85 | 3,055 |
| Scows and house boats | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 6 | 850 |
| Pile drivers | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 1 | 2,000 |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Purse seines | 37 | 18,500 | 22 | 8,500 | 2 | 1,000 | 1 | 500 | 12 | 5,700 |
| Haul seines | 52 | 4,650 | 25 | 1,950 | 8 | 600 | 13 | 1,025 | 36 | 2,930 |
| Gill nets, drift | 193 | 8,760 | 73 | 1,900 | 4 | 100 | 1 | 300 | 7 | 1,950 |
| Gill nets, set | 82 | 820 | 143 | 3,600 | 16 | 400 | 22 | 600 | 8 | 88 |
| Trap nets, stationary | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 4 | 13,500 |
| Shore and accessory property | ..... | 166,800 | ..... | 15,375 | ..... | 200 | ..... | 300 | ..... | 850 |
| Cash capital | ..... | 60,000 | ..... | 5,000 | ..... | ..... | ..... | ..... | ..... | ..... |
| Total | ..... | 409,480 | ..... | 103,325 | ..... | 5,680 | ..... | 7,835 | ..... | 67,823 |

INVESTMENT IN THE SALMON FISHERIES OF WASHINGTON, BY COUNTIES, IN 1909—Continued.

| Items. | Clallam. | | Jefferson. | | Chehalis. | | Pacific. | | Wahkiakum. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 3 | $12,000 | 4 | $29,000 | 1 | $3,000 | 6 | $16,700 | 13 | $36,100 |
| Tonnage | 27 | | 50 | | 8 | | 48 | | 101 | |
| Outfit | | 4,000 | | 6,100 | | 500 | | 4,315 | | 10,660 |
| Power boats | 1 | 1,500 | | | | | 2 | 1,800 | 1 | 450 |
| Fishing boats, power | 2 | 1,600 | 5 | 2,200 | 5 | 2,500 | 88 | 46,800 | 72 | 43,500 |
| Fishing boats, sail and row | 212 | 9,580 | 29 | 940 | 115 | 8,350 | 317 | 22,820 | 191 | 38,735 |
| Scows and house boats | 2 | 1,000 | 16 | 5,050 | 1 | 400 | 9 | 3,300 | 16 | 8,990 |
| Pile drivers | | | 1 | 5,000 | 3 | 450 | 37 | 23,300 | | |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Purse seines | | | | | | | 2 | 500 | | |
| Haul seines | 8 | 900 | 11 | 800 | | | 2 | 350 | 11 | 5,500 |
| Gill nets, drift | 70 | 700 | 5 | 340 | 100 | 8,000 | 207 | 36,000 | 417 | 70,700 |
| Gill nets, set | 8 | 100 | 25 | 430 | 189 | 9,724 | 46 | 1,340 | 33 | 615 |
| Trap nets, stationary | | | 2 | 8,000 | 15 | 3,400 | 280 | 506,400 | 52 | 36,800 |
| Trap nets, floating | | | 1 | 2,000 | | | | | | |
| Lines, trolling | | 246 | | | | | | | | |
| Shore and accessory property | | 20,325 | | 60,345 | | 36,753 | | 59,625 | | 310,455 |
| Cash capital | | 20,000 | | 50,000 | | 20,000 | | 38,000 | | 190,500 |
| Total | | 71,951 | | 170,205 | | 93,077 | | 761,250 | | 753,005 |

| Items. | Cowlitz. | | Clarke. | | Skamania. | | Klickitat. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 1 | $1,000 | | | | | | | 93 | $440,500 |
| Tonnage | 5 | | | | | | | | 1,158 | |
| Outfit | | 350 | | | | | | | | 135,625 |
| Power boats | | | | | | | | | 5 | 3,950 |
| Fishing boats, power | 28 | 11,700 | 1 | $400 | 10 | $4,000 | | | 464 | 472,650 |
| Fishing boats, sail and row | 29 | 1,200 | 12 | 360 | 46 | 1,945 | 15 | $720 | 2,244 | 128,945 |
| Scows and house boats | | | | | 2 | 750 | | | 398 | 168,673 |
| Pile drivers | | | | | | | | | 62 | 124,350 |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Purse seines | | | | | | | | | [a] 101 | 44,150 |
| Haul seines | 1 | 150 | | | 4 | 1,500 | 2 | 1,200 | [b] 246 | 28,955 |
| Gill nets, drift | | | | | | | | | [c] 1,620 | 168,831 |
| Gill nets, set | 18 | 350 | 12 | 180 | 32 | 455 | 2 | 20 | [d] 1,624 | 37,259 |
| Diver nets | 29 | 5,300 | 6 | 1,210 | 13 | 3,650 | | | [e] 48 | 10,160 |
| Trap nets, stationary | 21 | 8,400 | | | 3 | 750 | 4 | 1,000 | 525 | 1,324,968 |
| Trap nets, floating | | | | | | | | | 1 | 2,000 |
| Reef nets | | | | | | | | | 9 | 4,500 |
| Wheels, stationary | | | | | 10 | 44,000 | 3 | 32,000 | 13 | 76,000 |
| Wheels, scow | | | | | 2 | 7,000 | 1 | 1,500 | 3 | 8,500 |
| Lines, trolling | | | | | | | | | | 261 |
| Shore and accessory property | | 21,800 | | 10 | | 5,075 | | 1,225 | | 1,730,030 |
| Cash capital | | 8,000 | | | | | | | | 1,424,500 |
| Total | | 58,250 | | 2,160 | | 69,125 | | 37,665 | | 6,334,807 |

[a] Aggregate length of 68,900 yards.
[b] Aggregate length of 44,824 yards.
[c] Aggregate length of 429,115 yards.
[d] Aggregate length of 92,030 yards.
[e] Aggregate length of 19,200 yards.

*Products.*—The total catch amounted to 155,069,194 pounds, valued at $4,335,702. Whatcom County leads in the catch. Sockeye salmon constitute about one-half of the total catch.

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909.

| Apparatus and species. | Whatcom. | | San Juan. | | Skagit. | | Island. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | | | | | |
| Chinook, or king | 37,568 | $1,514 | 24,094 | $840 | 12,000 | $540 | 2,000 | $100 |
| Coho, or silver | 346,000 | 8,880 | 280,008 | 7,000 | 200,000 | 5,000 | 42,000 | 1,050 |
| Dog, or chum | 496,000 | 2,480 | 280,000 | 1,400 | 160,000 | 800 | 112,000 | 560 |
| Humpback, or pink | ..... | ..... | 175,000 | 350 | 30,000 | 300 | ..... | ..... |
| Sockeye, or blueback | 1,146,000 | 43,600 | 973,000 | 35,000 | 650,000 | 26,000 | 140,000 | 5,666 |
| Steelhead trout | ..... | ..... | ..... | ..... | 2,000 | 100 | 800 | 40 |
| Total | 2,025,568 | 56,474 | 1,732,102 | 44,590 | 1,054,000 | 32,740 | 296,800 | 7,416 |
| HAUL SEINES. | | | | | | | | |
| Chinook, or king | ..... | ..... | ..... | ..... | 154,400 | 7,060 | ..... | ..... |
| Coho, or silver | 21,000 | 630 | ..... | ..... | 110,000 | 2,750 | 560,000 | 16,800 |
| Dog, or chum | 39,000 | 195 | ..... | ..... | 590,000 | 2,950 | 1,280,000 | 7,710 |
| Humpback, or pink | 14,000 | 35 | ..... | ..... | 20,000 | 50 | ..... | ..... |
| Steelhead trout | 7,000 | 350 | ..... | ..... | 2,428 | 121 | ..... | ..... |
| Total | 81,000 | 1,210 | ..... | ..... | 876,828 | 12,931 | 1,840,000 | 24,510 |
| GILL NETS. | | | | | | | | |
| Chinook, or king | 22,332 | 967 | 47,300 | 1,880 | 617,362 | 25,753 | ..... | ..... |
| Coho, or silver | 1,122,000 | 29,200 | 79,200 | 1,980 | 662,376 | 20,873 | 1,500 | 45 |
| Dog, or chum | 70,000 | 350 | 4,800 | 24 | 673,838 | 3,573 | 3,000 | 30 |
| Humpback, or pink | ..... | ..... | ..... | ..... | 17,800 | 221 | ..... | ..... |
| Sockeye, or blueback | 1,328,450 | 51,158 | 44,500 | 1,780 | 384,750 | 12,510 | 30,000 | 1,200 |
| Steelhead trout | ..... | ..... | ..... | ..... | 124,200 | 8,004 | ..... | ..... |
| Total | 2,542,782 | 81,675 | 175,800 | 5,664 | 2,480,326 | 70,934 | 34,500 | 1,275 |
| REEF NETS. | | | | | | | | |
| Chinook, or king | 5,000 | 250 | 40,000 | 2,000 | ..... | ..... | ..... | ..... |
| Coho, or silver | 27,000 | 810 | 109,000 | 3,270 | ..... | ..... | ..... | ..... |
| Dog, or chum | 6,000 | 50 | 90,000 | 450 | ..... | ..... | ..... | ..... |
| Sockeye, or blueback | 75,000 | 3,000 | 290,000 | 11,600 | ..... | ..... | ..... | ..... |
| Total | 113,000 | 4,110 | 529,000 | 17,320 | ..... | ..... | ..... | ..... |
| TRAP NETS. | | | | | | | | |
| Chinook, or king | 1,378,391 | 66,229 | 574,072 | 25,697 | 354,929 | 18,270 | 1,272,680 | 111,735 |
| Coho, or silver | 3,387,624 | 73,940 | 718,124 | 17,967 | 482,116 | 12,271 | 1,615,314 | 42,876 |
| Dog, or chum | 570,412 | 2,852 | 229,408 | 1,148 | 1,227,536 | 6,457 | 857,760 | 4,789 |
| Humpback, or pink | 8,440,850 | 21,102 | 4,205,320 | 11,585 | 1,613,188 | 4,179 | 2,381,428 | 5,954 |
| Sockeye, or blueback | 41,032,910 | 1,558,804 | 7,665,005 | 187,312 | 2,881,185 | 108,398 | 4,574,145 | 168,468 |
| Steelhead trout | ..... | ..... | 272 | 13 | 4,000 | 260 | 45,310 | 2,266 |
| Total | 54,810,187 | 1,722,927 | 13,392,201 | 243,722 | 6,562,954 | 149,835 | 10,746,637 | 336,088 |
| TOTAL. | | | | | | | | |
| Chinook, or king | 1,443,291 | 68,960 | 685,466 | 30,417 | 1,138,691 | 51,623 | 1,274,680 | 111,835 |
| Coho, or silver | 4,903,624 | 113,460 | 1,186,332 | 30,217 | 1,454,492 | 40,894 | 2,218,814 | 60,771 |
| Dog, or chum | 1,181,412 | 5,927 | 604,208 | 3,022 | 2,651,374 | 13,780 | 2,252,760 | 13,089 |
| Humpback, or pink | 8,454,850 | 21,137 | 4,380,320 | 11,935 | 1,680,988 | 4,750 | 2,381,428 | 5,954 |
| Blueback, or sockeye | 43,582,360 | 1,656,562 | 8,972,505 | 235,692 | 3,915,935 | 146,908 | 4,744,145 | 175,334 |
| Steelhead trout | 7,000 | 350 | 272 | 13 | 132,628 | 8,485 | 46,110 | 2,306 |
| Grand total | 59,572,537 | 1,866,396 | 15,829,103 | 311,296 | 10,974,108 | 266,440 | 12,917,937 | 369,289 |

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

| Apparatus and species. | Snohomish. | | King. | | Pierce. | | Thurston. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | | | | | |
| Chinook, or king | 8,000 | $400 | | | 82,285 | $4,400 | 1,250 | $50 |
| Coho, or silver | 159,998 | 4,400 | 766,000 | $21,175 | 513,340 | 13,833 | 54,396 | 1,510 |
| Dog, or chum | 350,000 | 1,700 | 1,640,000 | 14,500 | 2,482,000 | 12,410 | 570,000 | 3,600 |
| Sockeye, or blueback | 800,000 | 28,800 | 7,050,000 | 282,000 | 4,394,995 | 158,220 | 125,000 | 5,000 |
| Steelhead trout | | | 14,100 | 987 | 10,400 | 520 | 400 | 20 |
| Total | 1,317,998 | 35,300 | 9,470,100 | 318,662 | 7,483,020 | 189,383 | 751,046 | 10,180 |
| HAUL SEINES. | | | | | | | | |
| Chinook, or king | | | 65,500 | 4,585 | 18,743 | 1,312 | | |
| Coho, or silver | 155,250 | 3,125 | 364,000 | 11,000 | 462,000 | 13,000 | 60,000 | 2,000 |
| Dog, or chum | 399,000 | 1,995 | 808,000 | 10,100 | 1,293,000 | 8,750 | 340,000 | 6,800 |
| Humpback, or pink | 202,000 | 503 | | | | | | |
| Total | 756,250 | 5,623 | 1,237,500 | 25,685 | 1,773,743 | 23,062 | 400,000 | 8,800 |
| GILL NETS. | | | | | | | | |
| Chinook, or king | 337,900 | 12,164 | 49,500 | 3,960 | 30,000 | 2,400 | | |
| Coho, or silver | 438,256 | 16,480 | 555,000 | 18,500 | 246,000 | 10,250 | 90,000 | 3,000 |
| Dog, or chum | 101,380 | 731 | 70,400 | 440 | 32,000 | 200 | 48,000 | 240 |
| Humpback, or pink | | | 42,000 | 525 | | | | |
| Sockeye, or blueback | | | 335,500 | 13,420 | | | | |
| Steelhead trout | 142,243 | 9,293 | 205,000 | 12,300 | 100,000 | 10,000 | 30,000 | 1,500 |
| Total | 1,019,779 | 38,668 | 1,257,400 | 49,145 | 408,000 | 22,850 | 168,000 | 4,740 |
| TRAP NETS. | | | | | | | | |
| Chinook, or king | 385,150 | 16,716 | | | | | | |
| Coho, or silver | 908,764 | 23,167 | | | | | | |
| Dog, or chum | 813,200 | 4,066 | | | | | | |
| Humpback, or pink | 354,000 | 1,383 | | | | | | |
| Steelhead trout | 27,000 | 1,350 | | | | | | |
| Total | 2,488,114 | 46,682 | | | | | | |
| LINES. | | | | | | | | |
| Coho, or silver | 281,250 | 7,500 | | | | | | |
| TOTAL. | | | | | | | | |
| Chinook, or king | 731,050 | 29,280 | 115,000 | 8,545 | 131,028 | 8,112 | 1,250 | 50 |
| Coho, or silver | 1,943,518 | 54,672 | 1,685,000 | 50,675 | 1,221,340 | 37,083 | 204,396 | 6,510 |
| Dog, or chum | 1,663,580 | 8,492 | 2,518,400 | 25,040 | 3,807,000 | 21,360 | 958,000 | 10,640 |
| Humpback, or pink | 556,000 | 1,886 | 42,000 | 525 | | | | |
| Blueback, or sockeye | 800,000 | 28,800 | 7,385,500 | 295,420 | 4,394,995 | 158,220 | 125,000 | 5,000 |
| Steelhead trout | 169,243 | 10,643 | 219,100 | 13,287 | 110,400 | 10,520 | 30,400 | 1,520 |
| Grand total | 5,863,391 | 133,773 | 11,965,000 | 393,492 | 9,664,763 | 235.295 | 1,319,046 | 23,720 |

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

| Apparatus and species. | Mason. | | Kitsap. | | Clallam. | | Jefferson. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | | | | | |
| Chinook, or king | | | 40,000 | $2,000 | | | | |
| Coho, or silver | 108,000 | $2,700 | 613,990 | 15,350 | | | | |
| Dog, or chum | 400,000 | 2,000 | 2,540,000 | 13,700 | | | | |
| Sockeye, or blueback | 100,000 | 4,000 | 2,045,000 | 81,800 | | | | |
| Steelhead trout | 600 | 42 | 4,900 | 245 | | | | |
| Total | 608,600 | 8,742 | 5,243,890 | 113,095 | | | | |
| HAUL SEINES. | | | | | | | | |
| Chinook, or king | | | 12,000 | 600 | 31,000 | $1,550 | 21,000 | $1,050 |
| Coho, or silver | 437,998 | 11,480 | 378,000 | 9,990 | 110,000 | 3,300 | 122,000 | 3,760 |
| Dog, or chum | 756,000 | 4,370 | 1,129,000 | 8,970 | 39,000 | 330 | 227,600 | 2,488 |
| Sockeye, or blueback | | | | | | | 8,000 | 400 |
| Steelhead trout | 3,000 | 210 | 17,080 | 854 | 14,200 | 710 | 5,200 | 260 |
| Total | 1,196,998 | 16,060 | 1,536,080 | 20,414 | 194,200 | 5,890 | 383,800 | 7,958 |
| GILL NETS. | | | | | | | | |
| Chinook, or king | | | | | 75,000 | 3,750 | 17,000 | 970 |
| Coho, or silver | 40,000 | 1,200 | 18,000 | 490 | 60,515 | 1,578 | 74,000 | 2,220 |
| Dog, or chum | 81,000 | 640 | 33,000 | 395 | 30,000 | 150 | 48,000 | 240 |
| Sockeye, or blueback | 25,000 | 1,000 | 154,000 | 6,140 | | | 24,500 | 980 |
| Steelhead trout | 4,000 | 240 | 2,300 | 115 | 33,055 | 1,653 | 7,000 | 350 |
| Total | 150,000 | 3,080 | 207,300 | 7,140 | 198,570 | 7,131 | 170,500 | 4,760 |
| TRAP NETS. | | | | | | | | |
| Chinook, or king | | | 106,225 | 5,305 | | | 4,282 | 199 |
| Coho, or silver | | | 504,074 | 13,020 | | | 265,662 | 6,642 |
| Dog, or chum | | | 1,333,704 | 6,669 | | | 1,036,472 | 5,182 |
| Steelhead trout | | | | | | | 1,735 | 87 |
| Total | | | 1,944,003 | 24,994 | | | 1,308,151 | 12,110 |
| LINES. | | | | | | | | |
| Chinook, or king | | | | | 110,880 | 4,800 | | |
| Coho, or silver | | | | | 571,284 | 17,649 | | |
| Dog, or chum | | | | | 4,000 | 20 | | |
| Total | | | | | 686,164 | 22,469 | | |
| TOTAL. | | | | | | | | |
| Chinook, or king | | | 158,225 | 7,905 | 216,880 | 10,100 | 42,282 | 2,219 |
| Coho, or silver | 585,998 | 15,380 | 1,514,064 | 38,850 | 741,799 | 22,527 | 461,662 | 12,622 |
| Dog, or chum | 1,237,000 | 7,010 | 5,035,704 | 29,734 | 73,000 | 500 | 1,312,072 | 7,910 |
| Blueback, or sockeye | 125,000 | 5,000 | 2,199,000 | 87,940 | | | 32,500 | 1,380 |
| Steelhead trout | 7,600 | 492 | 24,280 | 1,214 | 47,255 | 2,363 | 13,935 | 697 |
| Grand total | 1,955,598 | 27,882 | 8,931,273 | 165,643 | 1,078,934 | 35,490 | 1,862,451 | 24,828 |

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

| Apparatus and species. | Chehalis. | | Pacific. | | Wahkiakum. | | Cowlitz. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | | | | | |
| Chinook, or king | | | 8,919 | $535 | | | | |
| Coho, or silver | | | 2,184 | 44 | | | | |
| Sockeye, or blueback | | | 1,090 | 49 | | | | |
| Steelhead trout | | | 4,742 | 190 | | | | |
| Total | | | 16,935 | 818 | | | | |
| HAUL SEINES. | | | | | | | | |
| Chinook, or king | | | 11,500 | 345 | 312,616 | $18,957 | 50,000 | $3,000 |
| Coho, or silver | | | | | 42,417 | 848 | | |
| Sockeye, or blueback | | | | | 19,722 | 888 | 12,000 | 600 |
| Steelhead trout | | | | | 112,221 | 5,411 | 28,000 | 1,400 |
| Total | | | 11,500 | 345 | 486,976 | 26,104 | 90,000 | 5,000 |
| GILL NETS. | | | | | | | | |
| Chinook, or king | 571,586 | $15,840 | 813,978 | 47,253 | 1,100,511 | 66,031 | | |
| Coho, or silver | 641,858 | 16,571 | 187,000 | 5,500 | 316,274 | 6,325 | | |
| Dog, or chum | 306,256 | 1,889 | 57,800 | 432 | 400,224 | 2,354 | | |
| Sockeye, or blueback | 638,000 | 23,200 | 4,500 | 203 | | | | |
| Steelhead trout | 118,000 | 4,066 | 45,142 | 2,328 | 139,877 | 6,994 | 13,000 | 620 |
| Total | 2,275,700 | 61,566 | 1,108,420 | 55,716 | 1,956,886 | 81,704 | 13,000 | 620 |
| DIVER NETS. | | | | | | | | |
| Chinook, or king | | | | | | | 172,667 | 10,820 |
| Steelhead trout | | | | | | | 76,533 | 3,827 |
| Total | | | | | | | 249,200 | 14,647 |
| TRAP NETS. | | | | | | | | |
| Chinook, or king | 49,000 | 1,113 | 1,208,963 | 67,996 | 31,669 | 492 | 69,690 | 303 |
| Coho, or silver | 165,000 | 3,875 | 620,461 | 9,649 | 458,571 | 9,172 | 203,000 | 4,290 |
| Dog, or chum | 36,000 | 225 | 725,652 | 8,996 | 634,384 | 3,490 | 65,600 | 410 |
| Sockeye, or blueback | | | 113,195 | 5,093 | | | | |
| Steelhead trout | | | 431,615 | 21,779 | 32,416 | 1,621 | 6,800 | 290 |
| Total | 250,000 | 5,213 | 3,099,886 | 113,513 | 1,157,040 | 14,775 | 345,090 | 5,293 |
| TOTAL. | | | | | | | | |
| Chinook, or king | 620,586 | 16,953 | 2,043,360 | 116,129 | 1,444,796 | 85,480 | 292,357 | 14,123 |
| Coho, or silver | 806,858 | 20,446 | 809,645 | 15,193 | 817,262 | 16,345 | 203,000 | 4,290 |
| Dog, or chum | 342,256 | 2,114 | 783,452 | 9,428 | 1,034,608 | 5,844 | 65,600 | 410 |
| Blueback, or sockeye | 638,000 | 23,200 | 118,785 | 5,345 | 19,722 | 888 | 12,000 | 600 |
| Steelhead trout | 118,000 | 4,066 | 481,499 | 24,297 | 284,514 | 14,026 | 124,333 | 6,137 |
| Grand total | 2,525,700 | 66,779 | 4,236,741 | 170,392 | 3,600,902 | 122,583 | 697,290 | 25,560 |

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

| Apparatus and species. | Clarke. | | Skamania. | | Klickitat. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | | | | | |
| Chinook, or king | | | | | | | 216,116 | $10,379 |
| Coho, or silver | | | | | | | 3,085,916 | 80,942 |
| Dog, or chum | | | | | | | 9,030,000 | 53,150 |
| Humpback, or pink | | | | | | | 205,000 | 650 |
| Sockeye, or blueback | | | | | | | 17,425,085 | 670,135 |
| Steelhead trout | | | | | | | 37,942 | 2,144 |
| Total | | | | | | | 30,000,059 | 817,400 |
| HAUL SEINES. | | | | | | | | |
| Chinook, or king | | | 180,000 | $12,600 | | | 856,759 | 51,059 |
| Coho, or silver | | | | | 200,000 | $6,000 | 3,022,665 | 84,683 |
| Dog, or chum | | | | | | | 6,900,600 | 54,658 |
| Humpback, or pink | | | | | | | 236,000 | 588 |
| Sockeye, or blueback | | | 24,000 | 1,200 | | | 63,722 | 3,088 |
| Steelhead trout | | | 18,000 | 900 | 300,480 | 15,024 | 507,609 | 25,240 |
| Total | | | 222,000 | 14,700 | 500,480 | 21,024 | 11,587,355 | 219,316 |
| GILL NETS. | | | | | | | | |
| Chinook, or king | 3,000 | $210 | 15,944 | 1,115 | 800 | 50 | 3,702,213 | 182,343 |
| Coho, or silver | 8,015 | 244 | 6,216 | 186 | 1,000 | 30 | 4,547,210 | 134,672 |
| Dog, or chum | | | | | | | 1,959,698 | 11,688 |
| Humpback, or pink | | | | | | | 59,800 | 746 |
| Sockeye, or blueback | | | 2,850 | 143 | | | 2,972,050 | 111,734 |
| Steelhead trout | 9,700 | 485 | 9,150 | 458 | 600 | 36 | 983,267 | 58,442 |
| Total | 20,715 | 939 | 34,160 | 1,902 | 2,400 | 116 | 14,224,238 | 499,625 |
| DIVER NETS. | | | | | | | | |
| Chinook, or king | 14,000 | 980 | 77,614 | 5,433 | | | 264,281 | 17,233 |
| Coho, or silver | | | 2,000 | 60 | | | 2,000 | 60 |
| Steelhead trout | 3,000 | 150 | 3,000 | 150 | | | 82,533 | 4,127 |
| Total | 17,000 | 1,130 | 82,614 | 5,643 | | | 348,814 | 21,420 |
| REEF NETS. | | | | | | | | |
| Chinook, or king | | | | | | | 45,000 | 2,250 |
| Coho, or silver | | | | | | | 136,000 | 4,080 |
| Dog, or chum | | | | | | | 96,000 | 500 |
| Sockeye, or blueback | | | | | | | 365,000 | 14,600 |
| Total | | | | | | | 642,000 | 21,430 |
| TRAP NETS. | | | | | | | | |
| Chinook, or king | | | 4,200 | 294 | 14,600 | 1,022 | 5,453,851 | 315,371 |
| Coho, or silver | | | 3,000 | 90 | 17,600 | 528 | 9,349,310 | 217,487 |
| Dog, or chum | | | | | | | 7,530,128 | 44,284 |
| Humpback, or pink | | | | | | | 16,994,786 | 44,203 |
| Sockeye, or blueback | | | 800 | 40 | 2,250 | 128 | 56,269,490 | 2,028,243 |
| Steelhead trout | | | 3,600 | 180 | 6,600 | 366 | 559,348 | 28,212 |
| Total | | | 11,600 | 604 | 41,050 | 2,044 | 96,156,913 | 2,677,800 |
| WHEELS. | | | | | | | | |
| Chinook, or king | | | 261,736 | 16,039 | 105,640 | 5,432 | 367,376 | 21,471 |
| Coho, or silver | | | 18,751 | 666 | 314,080 | 6,418 | 332,831 | 7,084 |
| Sockeye, or blueback | | | 173,842 | 7,358 | 11,800 | 508 | 185,642 | 7,866 |
| Steelhead trout | | | 52,552 | 2,081 | 204,000 | 10,240 | 256,552 | 12,321 |
| Total | | | 506,881 | 26,144 | 635,520 | 22,598 | 1,142,401 | 48,742 |
| LINES. | | | | | | | | |
| Chinook, or king | | | | | | | 110,880 | 4,800 |
| Coho, or silver | | | | | | | 852,534 | 25,149 |
| Dog, or chum | | | | | | | 4,000 | 20 |
| Total | | | | | | | 967,414 | 29,969 |

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND COUNTIES, IN 1909—Continued.

| Apparatus and species. | Clarke. | | Skamania. | | Klickitat. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| TOTAL. | | | | | | | | |
| Chinook, or king | 17,000 | $1,190 | 539,494 | $35,481 | 121,040 | $6,504 | 11,016,476 | $604,906 |
| Coho, or silver | 8,015 | 244 | 29,967 | 1,002 | 532,680 | 12,976 | 21,328,466 | 554,157 | |
| Dog, or chum | | | | | | | 25,520,426 | 164,300 |
| Humpback, or pink | | | | | | | 17,495,586 | 46,187 |
| Blueback, or sockeye | | | 201,492 | 8,741 | 14,050 | 636 | 77,280,989 | 2,835,666 |
| Steelhead trout | 12,700 | 635 | 86,302 | 3,769 | 511,680 | 25,666 | 2,427,251 | 130,486 |
| Grand total | 37,715 | 2,069 | 857,255 | 48,993 | 1,179,450 | 45,782 | 155,069,194 | 4,335,702 |

## STATISTICS BY WATERS.

*Persons employed.*—Puget Sound leads in the number of persons employed in all branches of the industry, followed by Columbia River, Grays Harbor, and Willapa Harbor in the order named.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF WASHINGTON, BY WATERS AND NATIONALITIES, IN 1909.

| Occupation and race. | Puget Sound. | Grays Harbor. | Willapa Harbor. | Columbia River. | Total. |
|---|---|---|---|---|---|
| Fishermen: | | | | | |
| Whites | 2,981 | 112 | 130 | 1,203 | 4,426 |
| Indians | 188 | 33 | | | 221 |
| Total | 3,169 | 145 | 130 | 1,203 | 4,647 |
| Shoresmen: | | | | | |
| Whites | 1,968 | 16 | 10 | 97 | 2,091 |
| Indians | 115 | | | | 115 |
| Chinese | 1,051 | 45 | 10 | 164 | 1,270 |
| Japanese | 1,004 | 15 | 10 | 73 | 1,102 |
| Total | 4,138 | 76 | 30 | 334 | 4,578 |
| Transporters: | | | | | |
| Whites | 252 | 3 | 4 | 33 | 292 |
| Total: | | | | | |
| Whites | 5,201 | 131 | 144 | 1,333 | 6,809 |
| Indians | 303 | 33 | | | 336 |
| Chinese | 1,051 | 45 | 10 | 164 | 1,270 |
| Japanese | 1,004 | 15 | 10 | 73 | 1,102 |
| Grand total | 7,559 | 224 | 164 | 1,570 | 9,517 |

*Investment, apparatus, etc.*—Puget Sound leads in the total investment. The principal forms of apparatus used in the waters of Washington are gill nets, haul and purse seines, traps, and wheels.

INVESTMENT IN THE SALMON FISHERIES OF WASHINGTON, BY WATERS, IN 1909.

| Items. | Puget Sound. | | Grays Harbor. | | Willapa Harbor. | | Columbia River. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 72 | $383,700 | 1 | $3,000 | 2 | $8,500 | 18 | $45,300 | 93 | $440,500 |
| Tonnage | 996 | | 8 | | 19 | | 135 | | 1,158 | |
| Outfit | | 119,860 | | 500 | | 2,190 | | 13,075 | | 135,625 |
| Power boats | 2 | 1,700 | | | | | 3 | 2,250 | 5 | 3,950 |
| Fishing boats, power | 260 | 363,750 | 5 | 2,500 | 24 | 7,800 | 175 | 98,600 | 464 | 472,650 |
| Fishing boats, sail and row | 1,519 | 54,815 | 115 | 8,350 | 48 | 6,340 | 562 | 59,440 | 2,244 | 128,945 |
| Scows and house boats | 370 | 155,233 | 1 | 400 | 8 | 2,800 | 19 | 10,240 | 398 | 168,673 |
| Pile drivers | 22 | 100,600 | 3 | 450 | 2 | 1,800 | 35 | 21,500 | 62 | 124,350 |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Purse seines | [a] 99 | 43,650 | | | | | [b] 2 | 500 | 101 | 44,150 |
| Haul seines | [c] 226 | 20,255 | | | [d] 2 | 350 | [e] 18 | 8,350 | 246 | 28,955 |
| Gill nets, drift | [f] 896 | 54,131 | [g] 100 | 8,000 | [h] 80 | 5,600 | [i] 544 | 101,100 | 1,620 | 168,831 |
| Gill nets, set | [j] 1,292 | 24,575 | [k] 189 | 9,724 | [l] 12 | 360 | [m] 131 | 2,600 | 1,624 | 37,259 |
| Diver nets | | | | | | | [n] 48 | 10,160 | 48 | 10,160 |
| Trap nets, stationary | 150 | 768,218 | 15 | 3,400 | 35 | 16,400 | 325 | 536,950 | 525 | 1,324,968 |
| Trap nets, floating | 1 | 2,000 | | | | | | | 1 | 2,000 |
| Reef nets | 9 | 4,500 | | | | | | | 9 | 4,500 |
| Wheels, stationary | | | | | | | 13 | 76,000 | 13 | 76,000 |
| Wheels, scow | | | | | | | 3 | 8,500 | 3 | 8,500 |
| Lines, trolling | | 261 | | | | | | | | 261 |
| Shore and accessory property | | 1,295,087 | | 36,753 | | 50,000 | | 348,190 | | 1,730,030 |
| Cash capital | | 1,168,000 | | 20,000 | | 18,000 | | 218,500 | | 1,424,500 |
| Total | | 4,560,335 | | 93,077 | | 120,140 | | 1,561,255 | | 6,334,807 |

[a] Aggregate length of 68,100 yards.
[b] Aggregate length of 800 yards.
[c] Aggregate length of 35,841 yards.
[d] Aggregate length of 300 yards.
[e] Aggregate length of 8,683 yards.
[f] Aggregate length of 112,915 yards.
[g] Aggregate length of 20,000 yards.
[h] Aggregate length of 28,000 yards.
[i] Aggregate length of 268,200 yards.
[j] Aggregate length of 57,980 yards.
[k] Aggregate length of 27,960 yards.
[l] Aggregate length of 720 yards.
[m] Aggregate length of 5,370 yards.
[n] Aggregate length of 19,200 yards.

*Products.*—The total catch amounted to 155,069,194 pounds, valued at $4,335,702, of which Puget Sound produced 141,934,141 pounds, valued at $3,853,544. Trap nets were the most effective. No humpbacks were taken commercially elsewhere than in Puget Sound, while no sockeyes or bluebacks were taken commercially in Willapa Harbor.

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND WATERS, IN 1909.

| Apparatus and species. | Puget Sound. | | Grays Harbor. | | Willapa Harbor. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | | | |
| Chinook, or king | 207,197 | $9,844 | | | | |
| Coho, or silver | 3,083,732 | 80,898 | | | | |
| Dog, or chum | 9,030,000 | 53,150 | | | | |
| Humpback, or pink | 205,000 | 650 | | | | |
| Sockeye, or blueback | 17,423,995 | 670,086 | | | | |
| Steelhead trout | 33,200 | 1,954 | | | | |
| Total | 29,983,124 | 816,582 | | | | |
| HAUL SEINES. | | | | | | |
| Chinook, or king | 302,643 | 16,157 | | | 11,500 | $345 |
| Coho, or silver | 2,780,248 | 77,835 | | | | |
| Dog, or chum | 6,900,600 | 54,658 | | | | |
| Humpback, or pink | 236,000 | 588 | | | | |
| Sockeye, or blueback | 8,000 | 400 | | | | |
| Steelhead trout | 48,908 | 2,505 | | | | |
| Total | 10,276,399 | 152,143 | | | 11,500 | 345 |
| GILL NETS. | | | | | | |
| Chinook, or king | 1,196,394 | 51,844 | 571,586 | $15,840 | 40,000 | 1,200 |
| Coho, or silver | 3,386,847 | 105,816 | 641,858 | 16,571 | 22,000 | 2,200 |
| Dog, or chum | 1,195,418 | 7,013 | 306,256 | 1,889 | 9,800 | 162 |
| Humpback, or pink | 59,800 | 746 | | | | |
| Sockeye, or blueback | 2,326,700 | 88,188 | 638,000 | 23,200 | | |
| Steelhead trout | 647,798 | 43,455 | 118,000 | 4,066 | 16,000 | 800 |
| Total | 8,812,957 | 297,062 | 2,275,700 | 61,566 | 87,800 | 4,362 |
| REEF NETS. | | | | | | |
| Chinook, or king | 45,000 | 2,250 | | | | |
| Coho, or silver | 136,000 | 4,080 | | | | |
| Dog, or chum | 96,000 | 500 | | | | |
| Sockeye, or blueback | 365,000 | 14,600 | | | | |
| Total | 642,000 | 21,430 | | | | |
| TRAP NETS. | | | | | | |
| Chinook, or king | 4,075,729 | 244,151 | 49,000 | 1,113 | 187,799 | 6,890 |
| Coho, or silver | 7,881,678 | 189,883 | 165,000 | 3,875 | 262,271 | 2,485 |
| Dog, or chum | 6,068,492 | 31,163 | 36,000 | 225 | 643,332 | 8,482 |
| Humpback, or pink | 16,994,786 | 44,203 | | | | |
| Sockeye, or blueback | 56,153,245 | 2,022,982 | | | | |
| Steelhead trout | 78,317 | 3,976 | | | 170 | 7 |
| Total | 91,252,247 | 2,536,358 | 250,000 | 5,213 | 1,093,572 | 17,864 |
| LINES. | | | | | | |
| Chinook, or king | 110,880 | 4,800 | | | | |
| Coho, or silver | 852,534 | 25,149 | | | | |
| Dog, or chum | 4,000 | 20 | | | | |
| Total | 967,414 | 29,969 | | | | |
| TOTAL. | | | | | | |
| Chinook, or king | 5,937,843 | 329,046 | 620,586 | 16,953 | 239,299 | 8,435 |
| Coho, or silver | 18,121,039 | 483,661 | 806,858 | 20,446 | 284,271 | 4,685 |
| Dog, or chum | 23,294,510 | 146,504 | 342,256 | 2,114 | 653,132 | 8,644 |
| Humpback, or pink | 17,495,586 | 46,187 | | | | |
| Sockeye, or blueback | 76,276,940 | 2,796,256 | 638,000 | 23,200 | | |
| Steelhead trout | 808,223 | 51,890 | 118,000 | 4,066 | 16,170 | 807 |
| Grand total | 141,934,141 | 3,853,544 | 2,525,700 | 66,779 | 1,192,872 | 22,571 |

PRODUCTS OF THE SALMON FISHERIES OF WASHINGTON, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

| Apparatus and species. | Columbia River. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| PURSE SEINES. | | | | |
| Chinook, or king | 8,919 | $535 | 216,116 | $10,379 |
| Coho, or silver | 2,184 | 44 | 3,085,916 | 80,942 |
| Dog, or chum | ..... | ..... | 9,030,000 | 53,150 |
| Humpback, or pink | ..... | ..... | 205,000 | 650 |
| Sockeye, or blueback | 1,090 | 49 | 17,425,085 | 670,135 |
| Steelhead trout | 4,742 | 190 | 37,942 | 2,144 |
| Total | 16,935 | 818 | 30,000,059 | 817,400 |
| HAUL SEINES. | | | | |
| Chinook, or king | 542,616 | 34,557 | 856,759 | 51,059 |
| Coho, or silver | 242,417 | 6,848 | 3,022,665 | 84,683 |
| Dog, or chum | ..... | ..... | 6,900,600 | 54,658 |
| Humpback, or pink | ..... | ..... | 236,000 | 588 |
| Sockeye, or blueback | 55,722 | 2,688 | 63,722 | 3,088 |
| Steelhead trout | 458,701 | 22,735 | 507,609 | 25,240 |
| Total | 1,299,456 | 66,828 | 11,587,355 | 219,316 |
| GILL NETS. | | | | |
| Chinook, or king | 1,894,233 | 113,459 | 3,702,213 | 182,343 |
| Coho, or silver | 496,505 | 10,085 | 4,547,210 | 134,672 |
| Dog, or chum | 448,224 | 2,624 | 1,959,698 | 11,688 |
| Humpback, or pink | ..... | ..... | 59,800 | 746 |
| Sockeye, or blueback | 7,350 | 346 | 2,972,050 | 111,734 |
| Steelhead trout | 201,469 | 10,121 | 983,267 | 58,442 |
| Total | 3,047,781 | 136,635 | 14,224,238 | 499,625 |
| DIVER NETS. | | | | |
| Chinook, or king | 264,281 | 17,233 | 264,281 | 17,233 |
| Coho, or silver | 2,000 | 60 | 2,000 | 60 |
| Steelhead trout | 82,533 | 4,127 | 82,533 | 4,127 |
| Total | 348,814 | 21,420 | 348,814 | 21,420 |
| REEF NETS. | | | | |
| Chinook, or king | ..... | ..... | 45,000 | 2,250 |
| Coho, or silver | ..... | ..... | 136,000 | 4,080 |
| Dog, or chum | ..... | ..... | 96,000 | 500 |
| Sockeye, or blueback | ..... | ..... | 365,000 | 14,600 |
| Total | ..... | ..... | 642,000 | 21,430 |
| TRAP NETS. | | | | |
| Chinook, or king | 1,141,323 | 63,217 | 5,453,851 | 315,371 |
| Coho, or silver | 1,040,361 | 21,244 | 9,349,310 | 217,487 |
| Dog, or chum | 782,304 | 4,414 | 7,530,128 | 44,284 |
| Humpback, or pink | ..... | ..... | 16,994,786 | 44,203 |
| Sockeye, or blueback | 116,245 | 5,261 | 56,269,490 | 2,028,243 |
| Steelhead trout | 480,861 | 24,229 | 559,348 | 28,212 |
| Total | 3,561,094 | 118,365 | 96,156,913 | 2,677,800 |
| WHEELS. | | | | |
| Chinook, or king | 367,376 | 21,471 | 367,376 | 21,471 |
| Coho, or silver | 332,831 | 7,084 | 332,831 | 7,084 |
| Sockeye, or blueback | 185,642 | 7,866 | 185,642 | 7,866 |
| Steelhead trout | 256,552 | 12,321 | 256,552 | 12,321 |
| Total | 1,142,401 | 48,742 | 1,142,401 | 48,742 |
| LINES. | | | | |
| Chinook, or king | ..... | ..... | 110,880 | 4,800 |
| Coho, or silver | ..... | ..... | 852,534 | 25,149 |
| Dog, or chum | ..... | ..... | 4,000 | 20 |
| Total | ..... | ..... | 967,414 | 29,969 |
| TOTAL. | | | | |
| Chinook, or king | 4,218,748 | 250,472 | 11,016,476 | 604,906 |
| Coho, or silver | 2,116,298 | 45,365 | 21,328,466 | 554,157 |
| Dog, or chum | 1,230,528 | 7,038 | 25,520,426 | 164,300 |
| Humpback, or pink | ..... | ..... | 17,495,586 | 46,187 |
| Sockeye, or blueback | 366,049 | 16,210 | 77,280,989 | 2,835,666 |
| Steelhead trout | 1,484,858 | 73,723 | 2,427,251 | 130,486 |
| Grand total | 9,416,481 | 392,808 | 155,069,194 | 4,335,702 |

*Products canned.*—Of the total pack of 1,926,539 cases, valued at $8,681,843, 1,757,539 cases, valued at $7,917,608, were packed on Puget Sound. One of the canneries operating on the Columbia River brought some sockeyes from Puget Sound, and the Puget Sound packers could have packed many more humpbacks than they did, but refrained from doing so because of the low prices prevailing at the time for canned humpbacks.

PACK OF CANNED SALMON IN WASHINGTON IN 1909.

| Products. | Puget Sound. | | Grays Harbor. | | Willapa Harbor. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Chinook, or king, red: | | | | | | |
| ½-pound flat | 655 | $2,620 | | | | |
| 1-pound flat | 8,278 | 49,668 | | | 197 | $837 |
| 1-pound flat exports | | | | | | |
| 1-pound tall | 2,003 | 10,817 | 3,544 | $15,594 | 1,258 | 5,032 |
| Total | 10,936 | 63,105 | 3,544 | 15,594 | 1,455 | 5,869 |
| Chinook, or king, white: | | | | | | |
| 1-pound flat | 2,033 | 8,210 | | | | |
| 1-pound tall | 378 | 1,289 | 2,177 | 5,225 | | |
| Total | 2,411 | 9,499 | 2,177 | 5,225 | | |
| Coho, or silver: | | | | | | |
| ½-pound flat | 24,061 | 65,771 | 1,088 | 3,046 | | |
| 1-pound flat | 21,431 | 103,268 | 1,176 | 5,174 | | |
| 1-pound tall | 109,249 | 458,845 | 7,299 | 29,926 | 4,822 | 17,359 |
| 2-pound nominal | 427 | 2,562 | | | | |
| Total | 155,168 | 630,446 | 9,563 | 38,146 | 4,822 | 17,359 |
| Chum, or dog: | | | | | | |
| ½-pound flat | | | | | 1,300 | 1,950 |
| 1-pound flat | 219 | 591 | | | | |
| 1-pound tall | 53,469 | 128,325 | 5,047 | 11,608 | 5,097 | 11,213 |
| Total | 53,688 | 128,916 | 5,047 | 11,608 | 6,397 | 13,163 |
| Humpback, or pink: | | | | | | |
| 1-pound flat | 2,030 | 5,585 | | | | |
| 1-pound tall | 368,963 | 896,757 | | | | |
| Total | 370,993 | 902,342 | | | | |
| Sockeye, or blueback: | | | | | | |
| ½-pound flat | 224,455 | 906,770 | | | | |
| 1-pound flat | 454,381 | 2,728,186 | 244 | 1,464 | | |
| 1-pound tall | 485,507 | 2,548,344 | 1,405 | 7,587 | | |
| Total | 1,164,343 | 6,183,300 | 1,649 | 9,051 | | |
| Grand total | 1,757,539 | 7,917,608 | 21,980 | 79,624 | 12,674 | 36,391 |

PACK OF CANNED SALMON IN WASHINGTON IN 1909—Continued.

| Products. | Columbia River. | | Total. | |
|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. |
| Chinook, or king, red: | | | | |
| ½-pound flat | 22,895 | $96,160 | 23,550 | $98,780 |
| 1-pound flat | 30,222 | 210,134 | 38,697 | 260,639 |
| 1-pound flat exports | 606 | 4,242 | 606 | 4,242 |
| 1-pound tall | 12,066 | 78,636 | 18,871 | 110,079 |
| 1-pound oval | 1,110 | 10,212 | 1,110 | 10,212 |
| Total | 66,899 | 399,384 | 82,834 | 483,952 |
| Chinook, or king, white: | | | | |
| 1-pound flat | | | 2,033 | 8,210 |
| 1-pound tall | | | 2,555 | 6,514 |
| Total | | | 4,588 | 14,724 |
| Coho, or silver: | | | | |
| ½-pound flat | 9,143 | 25,600 | 34,292 | 94,417 |
| 1-pound flat | 6,278 | 26,313 | 28,885 | 134,755 |
| 1-pound tall | 15,638 | 63,900 | 137,008 | 570,030 |
| 2-pound nominal | | | 427 | 2,562 |
| Total | 31,059 | 115,813 | 200,612 | 801,764 |
| Chum, or dog: | | | | |
| ½-pound flat | | | 1,300 | 1,950 |
| 1-pound flat | | | 219 | 591 |
| 1-pound tall | 20,051 | 46,786 | 83,664 | 197,932 |
| Total | 20,051 | 46,786 | 85,183 | 200,473 |
| Humpback, or pink: | | | | |
| 1-pound flat | | | 2,030 | 5,585 |
| 1-pound tall | | | 368,963 | 896,757 |
| Total | | | 370,993 | 902,342 |
| Sockeye, or blueback: | | | | |
| ½-pound flat | [a] 5,047 | 21,197 | 229,502 | 927,967 |
| 1-pound flat | 2,087 | 17,017 | 456,712 | 2,746,667 |
| 1-pound tall | 567 | 3,062 | 487,479 | 2,558,993 |
| Total | 7,701 | 41,276 | 1,173,693 | 6,233,627 |
| Steelhead trout: | | | | |
| ½-pound flat | 945 | 2,937 | 945 | 2,937 |
| 1-pound flat | 3,794 | 19,422 | 3,794 | 19,422 |
| 1-pound tall | 3,897 | 22,602 | 3,897 | 22,602 |
| Total | 8,636 | 44,961 | 8,636 | 44,961 |
| Grand total | 134,346 | 648,220 | [b] 1,926,539 | 8,681,843 |

[a] Includes 997 cases, valued at $4,187, packed with sockeyes from Puget Sound.
[b] All 1-pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of cases containing 48 1-pound cans, the pack is 1,781,317½ cases.

*Miscellaneous products.*—By far the greater part of the miscellaneous secondary products were prepared on Puget Sound. Pickled salmon predominate in quantity, but mild-cured salmon represent the greatest value.

MISCELLANEOUS SECONDARY PRODUCTS PACKED IN WASHINGTON IN 1909.

NOTE.—Mild-cured salmon have been figured on a basis of 800 pounds to the tierce and pickled fish on a basis of 200 pounds to the barrel.

| Products. | Puget Sound. | | Grays Harbor. | | Willapa Harbor. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | | | |
| Coho, or silver, round | 396,477 | $21,989 | | | | |
| Coho, or silver, dressed | 60,000 | 4,200 | | | | |
| Dog, or chum, round | 1,099,985 | 55,250 | | | | |
| Dog, or chum, dressed | 264,687 | 11,911 | | | | |
| Humpback, round | 62,945 | 1,888 | | | | |
| King, or spring, round | 70,183 | 7,018 | | | | |
| King, or spring, dressed | 4,000 | 400 | | | | |
| Steelhead trout, round | 202,165 | 18,195 | 70,000 | $6,300 | | |
| Total | 2,160,442 | 120,851 | 70,000 | 6,300 | | |
| Mild cured: | | | | | | |
| King, or spring | 1,687,200 | 210,770 | 60,000 | 9,000 | 23,200 | $1,856 |
| Pickled: | | | | | | |
| King, or spring | | | 1,000 | 540 | | |
| King, or spring, bellies | | | | | | |
| Dog, or chum | 50,000 | 175 | | | | |
| Humpback | 1,615,000 | 48,450 | | | | |
| Humpback bellies | 172,400 | 8,620 | | | | |
| Total | 1,837,400 | 57,245 | 1,000 | 540 | | |
| Smoked: | | | | | | |
| Coho, or silver | 30,000 | 1,800 | | | | |
| Dog, or chum | 517,245 | 25,862 | | | | |
| Dog, or chum, kippered | 5,000 | 500 | | | | |
| Humpback backs, kippered | 100,000 | 5,000 | | | | |
| King, or spring | 30,165 | 2,413 | | | | |
| King, or spring, white, kippered | 190,500 | 16,050 | | | | |
| Total | 872,910 | 51,625 | | | | |
| Fertilizer | 1,210,000 | 18,610 | | | | |
| Oil | 380,648 | 14,161 | | | | |
| Grand total | 8,148,600 | 473,262 | 131,000 | 15,840 | 23,200 | 1,856 |

MISCELLANEOUS SECONDARY PRODUCTS PACKED IN WASHINGTON IN 1909—Continued.

| Products. | Columbia River. | | Total. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | |
| Coho, or silver, round | 72,000 | $3,960 | 468,477 | $25,949 |
| Coho, or silver, dressed | | | 60,000 | 4,200 |
| Dog, or chum, round | | | 1,099,985 | 55,250 |
| Dog, or chum, dressed | | | 264,687 | 11,911 |
| Humpback, round | | | 62,945 | 1,888 |
| King, or spring, round | | | 70,183 | 7,018 |
| King, or spring, dressed | | | 4,000 | 400 |
| Steelhead trout, round | 232,000 | 22,120 | 504,165 | 46,615 |
| Total | 304,000 | 26,080 | 2,534,442 | 153,231 |
| Mild cured: | | | | |
| King, or spring | 522,400 | 52,200 | 2,292,800 | 273,826 |
| Pickled: | | | | |
| King, or spring | | | 1,000 | 540 |
| King, or spring, bellies | 6,750 | 671 | 6,750 | 671 |
| Dog, or chum | | | 50,000 | 175 |
| Humpback | | | 1,615,000 | 48,450 |
| Humpback bellies | | | 172,400 | 8,620 |
| Total | 6,750 | 671 | 1,845,150 | 58,456 |
| Smoked: | | | | |
| Coho, or silver | | | 30,000 | 1,800 |
| Dog, or chum | | | 517,245 | 25,862 |
| Dog, or chum, kippered | | | 5,000 | 500 |
| Humpback backs, kippered | | | 100,000 | 5,000 |
| King, or spring | | | 30,165 | 2,413 |
| King, or spring, white, kippered | | | 190,500 | 16,050 |
| Total | | | 872,910 | 51,625 |
| Fertilizer | | | 1,210,000 | 18,610 |
| Oil | | | [a] 380,648 | 14,161 |
| Grand total | 833,150 | 78,951 | 9,135,950 | 569,909 |

[a] Represents 50,713 gallons.

## COLUMBIA RIVER.

As the Columbia River forms the boundary between Oregon and Washington and the citizens of both States operate in the river, for convenience tables showing persons employed, investment, catch, and the packs of canned salmon and miscellaneous secondary products on both sides of the river are combined in the tables given below, in addition to showing most of these data in the regular state tables.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF THE COLUMBIA RIVER IN 1909.

| Occupation and race. | Number. | Occupation and race. | Number. |
|---|---|---|---|
| Fishermen: Whites | 4,443 | Transporters: Whites | 80 |
| Shoresmen: | | Total: | |
| Whites | 426 | Whites | 4,949 |
| Chinese | 417 | Chinese | 417 |
| Japanese | 268 | Japanese | 268 |
| Total | 1,111 | Grand total | 5,634 |

## Investment in the Salmon Fisheries of the Columbia River in 1909.

| Items. | Number. | Value. | Items. | Number. | Value. |
|---|---|---|---|---|---|
| Transporting vessels: | | | Apparatus, shore fisheries–Con. | | |
| Power vessels | 39 | $118,400 | Gill nets, drift | 2,755 | $571,305 |
| Tonnage | 335 | | Gill nets, set | 443 | 8,163 |
| Outfit | | 29,875 | Diver nets | 166 | 32,535 |
| Power boats | 14 | 26,550 | Trap nets | 346 | 562,700 |
| Fishing boats, power | 425 | 222,700 | Wheels, stationary | 39 | 389,000 |
| Fishing boats, sail and row | 1,923 | 254,395 | Wheels, scow | 12 | 30,500 |
| Scows and house boats | 110 | 51,950 | Shore and accessory property | | 1,577,300 |
| Pile drivers | 37 | 23,300 | Cash capital | | 647,000 |
| Apparatus, shore fisheries: | | | | | |
| Haul seines | 52 | 21,250 | Total | | 4,567,423 |
| Purse seines | 2 | 500 | | | |

## Catch, by Apparatus and Species, in the Salmon Fisheries of the Columbia River in 1909.

| Apparatus and species. | Pounds. | Value. | Apparatus and species. | Pounds. | Value. |
|---|---|---|---|---|---|
| PURSE SEINES. | | | TRAP NETS. | | |
| Chinook, or king | 8,919 | $535 | Blueback, or sockeye | 141,265 | $6,387 |
| Coho, or silver | 2,184 | 44 | Chinook, or king | 1,198,383 | 65,823 |
| Blueback, or sockeye | 1,090 | 49 | Dog, or chum | 931,564 | 5,188 |
| Steelhead trout | 4,742 | 190 | Silver, or coho | 1,602,581 | 32,888 |
| | | | Steelhead trout | 527,071 | 26,540 |
| Total | 16,935 | 818 | | | |
| | | | Total | 4,400,864 | 136,826 |
| HAUL SEINES. | | | WHEELS. | | |
| Blueback, or sockeye | 110,503 | 5,183 | Blueback, or sockeye | 949,165 | 38,898 |
| Chinook, or king | 1,392,377 | 85,261 | Chinook, or king | 1,091,751 | 64,082 |
| Dog, or chum | 24,000 | 150 | Silver, or coho | 603,453 | 12,683 |
| Silver, or coho | 506,439 | 12,135 | Steelhead trout | 592,819 | 27,835 |
| Steelhead trout | 1,078,118 | 52,562 | | | |
| Total | 3,111,437 | 155,291 | Total | 3,237,188 | 143,498 |
| GILL NETS. | | | TOTAL. | | |
| Blueback, or sockeye | 8,350 | 396 | Blueback, or sockeye | 1,210,373 | 50,913 |
| Chinook, or king | 11,958,512 | 667,221 | Chinook, or king | 16,534,480 | 938,808 |
| Dog, or chum | 542,472 | 3,223 | Dog, or chum | 1,498,036 | 8,561 |
| Silver, or coho | 792,774 | 16,504 | Silver, or coho | 3,509,431 | 74,314 |
| Steelhead trout | 515,940 | 25,292 | Steelhead trout | 2,803,023 | 136,636 |
| Total | 13,818,048 | 712,636 | Grand total | 25,555,343 | 1,209,232 |
| DIVER NETS. | | | | | |
| Chinook, or king | 884,538 | 55,886 | | | |
| Silver, or coho | 2,000 | 60 | | | |
| Steelhead trout | 84,333 | 4,217 | | | |
| Total | 970,871 | 60,163 | | | |

CANNED PACK ON BOTH SIDES OF THE COLUMBIA RIVER IN 1909.

| Products. | Cases.[a] | Value. |
|---|---|---|
| Blueback, or sockeye: | | |
| ½-pound flat | [b] 37,118 | $154,292 |
| 1-pound flat | 8,732 | 56,887 |
| 1-pound tall | [c] 617 | 3,382 |
| Total | 46,467 | 214,561 |
| Chinook, or king: | | |
| ½-pound flat | 90,281 | 379,181 |
| 1-pound flat | 84,212 | 603,651 |
| 1-pound flat exports | 606 | 4,242 |
| 1-pound tall | 29,519 | 193,827 |
| ½-pound oval | 534 | 2,670 |
| 1-pound oval | 1,919 | 18,142 |
| 2-pound nominal | 458 | 1,833 |
| Total | 207,529 | 1,203,546 |
| Chum, or dog: | | |
| 1-pound tall | 24,542 | 57,115 |
| Humpback, or pink: | | |
| 1-pound tall | [d] 55 | $132 |
| Silverside, coho, or white: | | |
| ½-pound flat | 12,447 | 34,852 |
| 1-pound flat | 14,498 | 62,468 |
| 1-pound tall | 21,455 | 87,750 |
| Total | 48,400 | 185,070 |
| Steelhead trout: | | |
| ½-pound flat | 8,009 | 25,021 |
| 1-pound flat | 5,159 | 27,117 |
| 1-pound tall | 8,217 | 47,658 |
| Total | 21,385 | 99,796 |
| Grand total | 348,378 | 1,760,220 |

[a] All 1-pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans.
[b] Of these, 5,592 cases, valued at $22,883, were filled with sockeyes brought from Puget Sound, Wash.
[c] Of these, 50 cases, valued at $320, were filled with sockeyes brought from Puget Sound, Wash.
[d] Filled with fish brought from Puget Sound, Wash.

PACK OF MISCELLANEOUS PRODUCTS ON BOTH SIDES OF THE COLUMBIA RIVER IN 1909.

| Products. | Pounds. | Value. |
|---|---|---|
| Frozen: | | |
| Chinook | 14,000 | $1,400 |
| Silverside | 288,175 | 17,828 |
| Steelhead trout | 1,646,662 | 163,887 |
| Total | 1,948,837 | 183,115 |
| Mild-cured: | | |
| Chinook | 4,432,246 | 443,184 |
| Pickled: | | |
| Chinook bellies | 6,750 | 671 |
| Smoked: | | |
| Chinook | 127,700 | $19,155 |
| Silverside | 20,000 | 2,000 |
| Total | 147,700 | 21,155 |
| Grand total | 6,535,533 | 648,125 |

## OREGON.

The catch of salmon in the Columbia River in 1909 was only fair, owing partly to the shortening of the open fishing season. On the coast streams conditions were far from favorable. Low water at one time kept the salmon from entering the streams; afterwards freshets and storms made fishing impossible at times. A few places, however, show increases over the previous year.

### STATISTICS BY COUNTIES.

*Persons employed.*—The total number of persons employed was 5,320. All of the fishermen and transporters were whites. Clatsop County, in which Astoria is located, has more than half of the persons employed.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF OREGON, BY COUNTIES AND NATIONALITIES, IN 1909.

| Counties. | Fishermen. | Shoresmen | | | | Transporters. | Total. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Whites. | Whites. | Chinese. | Japanese. | Total. | Whites. | Whites. | Chinese. | Japanese. | Total. |
| Wasco | 48 | 21 | 33 | 8 | 62 | ..... | 69 | 33 | 8 | 110 |
| Hood River | 6 | ..... | ..... | ..... | ..... | ..... | 6 | ..... | ..... | 6 |
| Multnomah | 88 | 29 | 68 | 42 | 139 | 2 | 119 | 68 | 42 | 229 |
| Clackamas | 86 | ..... | ..... | ..... | ..... | ..... | 86 | ..... | ..... | 86 |
| Columbia | 149 | 21 | ..... | ..... | 21 | 8 | 178 | ..... | ..... | 178 |
| Clatsop | 2,863 | 258 | 152 | 145 | 555 | 37 | 3,158 | 152 | 145 | 3,455 |
| Tillamook | 154 | 11 | 50 | 9 | 70 | 4 | 169 | 50 | 9 | 228 |
| Lincoln | 144 | 9 | 19 | 14 | 42 | ..... | 153 | 19 | 14 | 186 |
| Lane | 121 | 7 | 30 | 14 | 51 | 2 | 130 | 30 | 14 | 174 |
| Douglas | 100 | 5 | 19 | 10 | 34 | 2 | 107 | 19 | 10 | 136 |
| Coos | 276 | 26 | 36 | 14 | 76 | 10 | 312 | 36 | 14 | 362 |
| Curry | 33 | 15 | 4 | ..... | 19 | 5 | 53 | 4 | ..... | 57 |
| Josephine | 111 | 2 | ..... | ..... | 2 | ..... | 113 | ..... | ..... | 113 |
| Total | 4,179 | 404 | 411 | 256 | 1,071 | 70 | 4,653 | 411 | 256 | 5,320 |

*Investment, apparatus, etc.*—The total investment amounted to $3,641,775, of which more than one-half is contributed by Clatsop County. The gill net is the principal form of apparatus used in most counties.

INVESTMENT IN THE SALMON FISHERIES OF OREGON, BY COUNTIES, IN 1909.

| Items. | Wasco. | | Hood River. | | Multnomah. | | Clackamas. | | Columbia. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | ..... | ..... | ..... | ..... | 1 | $4,000 | ..... | ..... | 4 | $10,900 |
| Tonnage | ..... | ..... | ..... | ..... | 11 | ..... | ..... | ..... | 26 | ..... |
| Outfit | ..... | ..... | ..... | ..... | ..... | 600 | ..... | ..... | ..... | 1,570 |
| Power boats | ..... | ..... | ..... | ..... | 1 | 1,000 | ..... | ..... | 2 | 1,800 |
| Fishing boats, power | 1 | $2,000 | ..... | ..... | 16 | 7,900 | ..... | ..... | 76 | 17,100 |
| Fishing boats, sail and row | 16 | 800 | 6 | $240 | 53 | 2,300 | 43 | $1,290 | 33 | 1,810 |
| Scows and house boats | ..... | ..... | ..... | ..... | 5 | 1,350 | ..... | ..... | 4 | 1,500 |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Haul seines | 1 | 500 | ..... | ..... | 1 | 400 | ..... | ..... | 4 | 1,400 |
| Gill nets, drift | ..... | ..... | ..... | ..... | 8 | 560 | 72 | 3,470 | ..... | ..... |
| Gill nets, set | 4 | 70 | 20 | 360 | 52 | 871 | 71 | 792 | 50 | 920 |
| Diver nets | ..... | ..... | ..... | ..... | 26 | 6,250 | ..... | ..... | 89 | 15,825 |
| Pound nets | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 10 | 6,750 |
| Wheels, stationary | 14 | 260,000 | ..... | ..... | 12 | 53,000 | ..... | ..... | ..... | ..... |
| Wheels, scow | 4 | 6,000 | ..... | ..... | 5 | 16,000 | ..... | ..... | ..... | ..... |
| Shore and accessory property | ..... | 261,600 | ..... | ..... | ..... | 123,015 | ..... | 115 | ..... | 69,565 |
| Cash capital | ..... | 45,000 | ..... | ..... | ..... | 103,500 | ..... | ..... | ..... | 15,000 |
| Total | ..... | 575,970 | ..... | 600 | ..... | 320,746 | ..... | 5,667 | ..... | 144,140 |

INVESTMENT IN THE SALMON FISHERIES OF OREGON, BY COUNTIES, IN 1909—Continued.

| Items. | Clatsop. | | Tillamook. | | Lincoln. | | Lane. | | Douglas. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 16 | $58,200 | 2 | $7,300 | ..... | ..... | 1 | $3,000 | 1 | $2,000 |
| Tonnage | 163 | ..... | 16 | ..... | ..... | ..... | 7 | ..... | 5 | ..... |
| Outfit | ..... | 14,630 | ..... | 1,750 | ..... | ..... | ..... | 950 | ..... | 400 |
| Power boats | 8 | 21,500 | 1 | 2,000 | 2 | $600 | ..... | ..... | ..... | ..... |
| Fishing boats, power | 157 | 97,100 | 3 | 600 | 3 | 1,500 | 6 | 1,200 | ..... | ..... |
| Fishing boats, sail and row | 1,210 | 188,515 | 74 | 5,550 | 73 | 5,925 | 90 | 2,670 | 50 | 2,100 |
| Scows and house boats | 82 | 38,860 | ..... | ..... | ..... | ..... | 7 | 1,020 | ..... | ..... |
| Pile drivers | 2 | 1,800 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Haul seines | 28 | 10,600 | ..... | ..... | ..... | ..... | 1 | 130 | ..... | ..... |
| Gill nets, drift | 2,131 | 466,175 | 63 | 8,230 | 112 | 10,400 | 51 | 6,195 | 30 | 2,125 |
| Gill nets, set | 115 | 2,550 | 151 | 4,530 | 153 | 4,490 | 108 | 1,502 | 116 | 4,420 |
| Diver nets | 3 | 300 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Pound nets | 11 | 19,000 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Shore and accessory property | ..... | 774,815 | ..... | 69,883 | ..... | 41,848 | ..... | 17,100 | ..... | 21,589 |
| Cash capital | ..... | 265,000 | ..... | 28,000 | ..... | 12,500 | ..... | 13,500 | ..... | 12,000 |
| Total | ..... | 1,959,045 | ..... | 127,843 | ..... | 77,263 | ..... | 47,267 | ..... | 44,634 |

| Items. | Coos. | | Curry. | | Josephine. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | 4 | $24,500 | 1 | $10,000 | ..... | ..... | 30 | $119,900 |
| Tonnage | 34 | ..... | 26 | ..... | ..... | ..... | 288 | ..... |
| Outfit | ..... | 4,100 | ..... | 1,350 | ..... | ..... | ..... | 25,350 |
| Power boats | ..... | ..... | 1 | 2,000 | ..... | ..... | 15 | 28,900 |
| Fishing boats, power | 25 | 12,200 | ..... | ..... | ..... | ..... | 287 | 139,600 |
| Fishing boats, sail and row | 164 | 8,125 | 22 | 3,300 | 56 | $1,920 | 1,890 | 224,545 |
| Scows and house boats | 16 | 2,320 | ..... | ..... | ..... | ..... | 114 | 45,050 |
| Pile drivers | ..... | ..... | ..... | ..... | ..... | ..... | 2 | 1,800 |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | 8 | 2,350 | 1 | 300 | 4 | 600 | [a] 48 | 16,280 |
| Gill nets, drift | 279 | 23,176 | 6 | 800 | 66 | 2,200 | [b] 2,818 | 523,331 |
| Gill nets, set | 166 | 4,720 | 102 | 2,305 | 14 | 84 | [c] 1,122 | 27,614 |
| Diver nets | ..... | ..... | ..... | ..... | ..... | ..... | [d] 418 | 22,375 |
| Pound nets | ..... | ..... | ..... | ..... | ..... | ..... | 21 | 25,750 |
| Wheels, stationary | ..... | ..... | ..... | ..... | ..... | ..... | 26 | 313,000 |
| Wheels, scow | ..... | ..... | ..... | ..... | ..... | ..... | 9 | 22,000 |
| Shore and accessory property | ..... | 67,400 | ..... | 100,400 | ..... | 7,450 | ..... | 1,554,780 |
| Cash capital | ..... | 42,000 | ..... | 15,000 | ..... | ..... | ..... | 551,500 |
| Total | ..... | 190,891 | ..... | 135,455 | ..... | 12,254 | ..... | 3,641,775 |

[a] Aggregate length of 22,855 yards.
[b] Aggregate length of 1,187,832 yards.
[c] Aggregate length of 59,625 yards.
[d] Aggregate length of 46,600 yards.

*Products.*—The total catch amounted to 22,191,291 pounds, valued at $968,983, of which Clatsop County contributed more than one-half. Gill nets catch more than two-thirds of the total. Chinook salmon constitute more than one-half of the total catch.

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY SPECIES AND APPARATUS, IN 1909.

| Apparatus and species. | Wasco. | | Hood River. | | Multnomah. | | Clackamas. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| SEINES. | | | | | | | | |
| Blueback | | | | | 6,000 | $300 | | |
| Chinook, fresh | | | | | 41,000 | 2,870 | | |
| Silver | 206,000 | $4,120 | | | | | | |
| Steelhead trout | 105,280 | 4,120 | | | 4,000 | 200 | | |
| Total | 311,280 | 8,240 | | | 51,000 | 3,370 | | |
| GILL NETS. | | | | | | | | |
| Blueback | | | | | 1,000 | 50 | | |
| Chinook, fresh | 1,800 | 144 | 9,700 | $679 | 18,000 | 770 | 208,000 | $8,320 |
| Silver | 2,600 | 78 | 14,700 | 521 | 17,100 | 513 | 7,000 | 210 |
| Steelhead trout | 800 | 48 | 5,500 | 306 | 20,900 | 975 | 24,000 | 720 |
| Total | 5,200 | 270 | 29,900 | 1,506 | 57,000 | 2,308 | 239,000 | 9,250 |
| DIVER NETS. | | | | | | | | |
| Chinook | | | | | 131,757 | 9,223 | | |
| Steelhead trout | | | | | 1,800 | 90 | | |
| Total | | | | | 133,557 | 9,313 | | |
| WHEELS. | | | | | | | | |
| Blueback | 534,555 | 21,382 | | | 228,968 | 9,650 | | |
| Chinook, fresh | 497,805 | 28,998 | | | 226,570 | 13,613 | | |
| Silver | 243,000 | 4,860 | | | 27,622 | 739 | | |
| Steelhead trout | 272,835 | 13,232 | | | 63,432 | 2,282 | | |
| Total | 1,548,195 | 68,472 | | | 546,592 | 26,284 | | |
| TOTAL. | | | | | | | | |
| Blueback | 534,555 | 21,382 | | | 235,968 | 10,000 | | |
| Chinook, fresh | 499,605 | 29,142 | 9,700 | 679 | 417,327 | 26,476 | 208,000 | 8,320 |
| Silver | 451,600 | 9,058 | 14,700 | 521 | 44,722 | 1,252 | 7,000 | 210 |
| Steelhead trout | 378,915 | 17,400 | 5,500 | 306 | 90,132 | 3,547 | 24,000 | 720 |
| Grand total | 1,864,675 | 76,982 | 29,900 | 1,506 | 788,149 | 41,275 | 239,000 | 9,250 |

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY SPECIES AND APPARATUS, IN 1909—Continued.

| Apparatus and species. | Columbia. | | Clatsop. | | Tillamook. | | Lincoln. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| SEINES. | | | | | | | | |
| Blueback | | | 48,781 | $2,195 | | | | |
| Chinook, fresh | 64,115 | $3,506 | 744,646 | 44,328 | | | | |
| Dog | | | 24,000 | 150 | | | | |
| Silver | 5,419 | 108 | 52,603 | 1,059 | | | | |
| Steelhead | 83,073 | 4,154 | 427,064 | 21,353 | | | | |
| Total | 152,607 | 7,768 | 1,297,094 | 69,085 | | | | |
| GILL NETS. | | | | | | | | |
| Chinook, fresh | | | 9,826,779 | 543,849 | 417,827 | $11,916 | 255,268 | $12,073 |
| Dog | | | 94,248 | 599 | 323,480 | 1,617 | 72,360 | 453 |
| Silver | | | 254,869 | 5,097 | 421,587 | 12,244 | 580,182 | 16,755 |
| Steelhead | 129,200 | 6,460 | 134,071 | 6,662 | 5,000 | 100 | 6,200 | 248 |
| Total | 129,200 | 6,460 | 10,309,967 | 556,207 | 1,167,894 | 25,877 | 914,010 | 29,529 |
| DIVER NETS. | | | | | | | | |
| Chinook | 476,500 | 28,710 | 12,000 | 720 | | | | |
| POUND NETS. | | | | | | | | |
| Blueback | | | 25,020 | 1,126 | | | | |
| Chinook, fresh | 13,450 | 59 | 43,610 | 2,547 | | | | |
| Dog | 145,100 | 748 | 4,160 | 26 | | | | |
| Silver | 544,000 | 11,280 | 18,220 | 364 | | | | |
| Steelhead | 13,600 | 680 | 32,610 | 1,631 | | | | |
| Total | 716,150 | 12,767 | 123,620 | 5,694 | | | | |
| TOTAL. | | | | | | | | |
| Blueback | | | 73,801 | 3,321 | | | | |
| Chinook, fresh | 554,065 | 32,275 | 10,627,035 | 591,444 | 417,827 | 11,916 | 255,268 | 12,073 |
| Dog | 145,100 | 748 | 122,408 | 775 | 323,480 | 1,617 | 72,360 | 453 |
| Silver | 549,419 | 11,388 | 325,692 | 6,520 | 421,587 | 12,244 | 580,182 | 16,755 |
| Steelhead trout | 225,873 | 11,294 | 593,745 | 29,646 | 5,000 | 100 | 6,200 | 248 |
| Grand total | 1,474,457 | 55,705 | 11,742,681 | 631,706 | 1,167,894 | 25,877 | 914,010 | 29,529 |

| Apparatus and species. | Lane. | | Douglas. | | Coos. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| SEINES. | | | | | | |
| Chinook, fresh | 5,000 | $125 | | | 16,200 | $466 |
| Silver | 8,000 | 200 | | | 176,452 | 4,411 |
| Steelhead | | | | | 3,900 | 78 |
| Total | 13,000 | 325 | | | 196,552 | 4,955 |
| GILL NETS. | | | | | | |
| Chinook, fresh | 82,304 | 2,057 | 62,912 | $1,573 | 127,581 | 3,497 |
| Chinook, salted | 12,000 | 480 | | | | |
| Dog | | | 36,000 | 225 | | |
| Silver | 970,348 | 24,256 | 351,072 | 8,728 | 1,210,048 | 30,251 |
| Steelhead | | | 13,000 | 260 | 55,000 | 1,100 |
| Total | 1,064,652 | 26,793 | 462,984 | 10,786 | 1,392,629 | 34,848 |
| TOTAL. | | | | | | |
| Chinook, fresh | 87,304 | 2,182 | 62,912 | 1,573 | 143,781 | 3,963 |
| Chinook, salted | 12,000 | 480 | | | | |
| Dog | | | 36,000 | 225 | | |
| Silver | 978,348 | 24,456 | 351,072 | 8,728 | 1,386,500 | 34,662 |
| Steelhead trout | | | 13,000 | 260 | 58,900 | 1,178 |
| Grand total | 1,077,652 | 27,118 | 462,984 | 10,786 | 1,589,181 | 39,803 |

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY SPECIES AND APPARATUS, IN 1909—Continued.

| Apparatus and species. | Curry. | | Josephine. | | Total. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| SEINES. | | | | | | |
| Blueback | | | | | 54,781 | $2,495 |
| Chinook, fresh | 25,652 | $292 | 5,248 | $330 | 901,861 | 51,917 |
| Dog | | | | | 24,000 | 150 |
| Silver | | | | | 448,474 | 9,898 |
| Steelhead | | | | | 623,317 | 29,905 |
| Total | 25,652 | 292 | 5,248 | 330 | 2,052,433 | 94,365 |
| GILL NETS. | | | | | | |
| Blueback | | | | | 1,000 | 50 |
| Chinook, fresh | 462,000 | 4,620 | 165,090 | 10,691 | 11,637,261 | 600,189 |
| Chinook, salted | | | | | 12,000 | 480 |
| Dog | | | | | 526,088 | 2,894 |
| Silver | 72,000 | 1,200 | 1,698 | 210 | 3,903,204 | 100,063 |
| Steelhead | 107,100 | 2,018 | 1,920 | 85 | 502,691 | 18,982 |
| Total | 641,100 | 7,838 | 168,708 | 10,986 | 16,582,244 | 722,658 |
| DIVER NETS. | | | | | | |
| Chinook, fresh | | | | | 620,257 | 38,653 |
| Steelhead | | | | | 1,800 | 90 |
| Total | | | | | 622,057 | 38,743 |
| POUND NETS. | | | | | | |
| Blueback | | | | | 25,020 | 1,126 |
| Chinook, fresh | | | | | 57,060 | 2,606 |
| Dog | | | | | 149,260 | 774 |
| Silver | | | | | 562,220 | 11,644 |
| Steelhead | | | | | 46,210 | 2,311 |
| Total | | | | | 839,770 | 18,461 |
| WHEELS. | | | | | | |
| Blueback | | | | | 763,523 | 31,032 |
| Chinook, fresh | | | | | 724,375 | 42,611 |
| Silver | | | | | 270,622 | 5,599 |
| Steelhead | | | | | 336,267 | 15,514 |
| Total | | | | | 2,094,787 | 94,756 |
| TOTAL. | | | | | | |
| Blueback | | | | | 844,324 | 34,703 |
| Chinook, fresh | 487,652 | 4,912 | 170,338 | 11,021 | 13,940,814 | 735,976 |
| Chinook, salted | | | | | 12,000 | 480 |
| Dog | | | | | 699,348 | 3,818 |
| Silver | 72,000 | 1,200 | 1,698 | 210 | 5,184,520 | 127,204 |
| Steelhead trout | 107,100 | 2,018 | 1,920 | 85 | 1,510,285 | 66,802 |
| Grand total | 666,752 | 8,130 | 173,956 | 11,316 | 22,191,291 | 968,983 |

## STATISTICS BY WATERS.

*Persons employed.*—The Columbia River furnishes about four-fifths of the total number of persons employed. The Coquille River is second and the Siuslaw River third in this respect.

PERSONS EMPLOYED IN THE SALMON FISHERIES OF OREGON, BY WATERS AND NATIONALITIES, IN 1909.

| Occupation and nationality. | Columbia River. | Nehalem River. | Tillamook Bay. | Nestucca River. | Siletz River. | Yaquina Bay and River. | Alsea Bay and River. |
|---|---|---|---|---|---|---|---|
| Fishermen: Whites | 3,240 | 48 | 46 | 60 | 16 | 63 | 65 |
| Shoresmen: | | | | | | | |
| Whites | 329 | 5 | 6 | ..... | 2 | 2 | 5 |
| Chinese | 253 | 23 | 27 | ..... | ..... | 5 | 14 |
| Japanese | 195 | 6 | 3 | ..... | ..... | 5 | 9 |
| Total | 777 | 34 | 36 | ..... | 2 | 12 | 28 |
| Transporters: Whites | 47 | ..... | 4 | ..... | ..... | ..... | ..... |
| Total: | | | | | | | |
| Whites | 3,616 | 53 | 56 | 60 | 18 | 65 | 70 |
| Chinese | 253 | 23 | 27 | ..... | ..... | 5 | 14 |
| Japanese | 195 | 6 | 3 | ..... | ..... | 5 | 9 |
| Grand total | 4,064 | 82 | 86 | 60 | 18 | 75 | 93 |

| Occupation and nationality. | Siuslaw River. | Umpqua River. | Coos Bay. | Coquille River. | Rogue River. | Total. |
|---|---|---|---|---|---|---|
| Fishermen: Whites | 121 | 100 | 114 | 162 | 144 | 4,179 |
| Shoresmen: | | | | | | |
| Whites | 7 | 5 | 14 | 12 | 17 | 404 |
| Chinese | 30 | 19 | 14 | 22 | 4 | 411 |
| Japanese | 14 | 10 | 4 | 10 | ..... | 256 |
| Total | 51 | 34 | 32 | 44 | 21 | 1,071 |
| Transporters: Whites | 2 | 2 | 10 | ..... | 5 | 70 |
| Total: | | | | | | |
| Whites | 130 | 107 | 138 | 174 | 166 | 4,653 |
| Chinese | 30 | 19 | 14 | 22 | 4 | 411 |
| Japanese | 14 | 10 | 4 | 10 | ..... | 256 |
| Grand total | 174 | 136 | 156 | 206 | 170 | 5,320 |

*Investment, apparatus, etc.*—More than two-thirds of the investment is found on the Columbia River, and this is the only river on which diver nets, pound or trap nets, and wheels are employed.

## Investment in the Salmon Fisheries of Oregon, by Waters, in 1909.

| Items. | Columbia River. | | Nehalem River. | | Tillamook Bay. | | Nestucca River. | | Siletz River. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 21 | $73,100 | | | 2 | $7,300 | | | | |
| Tonnage | 200 | | | | 16 | | | | | |
| Outfit | | 16,800 | | | | 1,750 | | | | |
| Power boats | 11 | 24,300 | | | 1 | 2,000 | | | 1 | $200 |
| Fishing boats, power | 250 | 124,100 | | | 3 | 600 | | | | |
| Fishing boats, sail and row | 1,361 | 194,955 | 24 | $1,800 | 20 | 1,500 | 30 | $2,250 | 9 | 1,425 |
| Scows and house boats | 91 | 41,710 | | | | | | | | |
| Pile drivers | 2 | 1,800 | | | | | | | | |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Haul seines | 34 | 12,900 | | | | | | | | |
| Gill nets, drift | 2,211 | 470,205 | 17 | 1,980 | 26 | 3,250 | 20 | 3,000 | 3 | 300 |
| Gill nets, set | 312 | 5,563 | 70 | 2,100 | 31 | 930 | 50 | 1,500 | 8 | 240 |
| Diver nets | 118 | 22,375 | | | | | | | | |
| Pound, or trap, nets | 21 | 25,750 | | | | | | | | |
| Wheels, stationary | 26 | 313,000 | | | | | | | | |
| Wheels, scow | 9 | 22,000 | | | | | | | | |
| Shore and accessory property | | 1,229,110 | | 53,078 | | 16,605 | | 200 | | 17,174 |
| Cash capital | | 428,500 | | 10,000 | | 18,000 | | | | 1,000 |
| Total | | 3,006,168 | | 68,958 | | 51,935 | | 6,950 | | 20,339 |

| Items. | Yaquina Bay and River. | | Alsea Bay and River. | | Siuslaw River. | | Umpqua River. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | | | | | 1 | $3,000 | 1 | $2,000 |
| Tonnage | | | | | 7 | | 5 | |
| Outfit | | | | | | 950 | | 400 |
| Power boats | | | 1 | $100 | | | | |
| Fishing boats, power | 3 | $1,500 | | | 6 | 1,200 | | |
| Fishing boats, sail and row | 30 | 2,600 | 34 | 1,900 | 90 | 2,670 | 50 | 2,100 |
| Scows and house boats | | | | | 7 | 1,020 | | |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | | | | | 1 | 130 | | |
| Gill nets, drift | 60 | 5,200 | 49 | 4,900 | 51 | 6,195 | 30 | 2,125 |
| Gill nets, set | 80 | 2,300 | 65 | 1,950 | 108 | 1,502 | 116 | 4,420 |
| Shore and accessory property | | 5,500 | | 19,174 | | 17,100 | | 21,589 |
| Cash capital | | 1,000 | | 10,500 | | 13,500 | | 12,000 |
| Total | | 18,100 | | 38,824 | | 47,267 | | 44,634 |

| Items. | Coos Bay. | | Coquille River. | | Rogue River. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | 4 | $24,500 | | | 1 | $10,000 | 30 | $119,900 |
| Tonnage | 34 | | | | 26 | | 288 | |
| Outfit | | 4,100 | | | | 1,350 | | 25,350 |
| Power boats | | | | | 1 | 2,000 | 15 | 28,900 |
| Fishing boats, power | 22 | 11,600 | 3 | $600 | | | 287 | 139,600 |
| Fishing boats, sail and row | 26 | 3,325 | 138 | 4,800 | 78 | 5,220 | 1,892 | 224,545 |
| Scows and house boats | 5 | 890 | 11 | 1,430 | | | 114 | 45,050 |
| Pile drivers | | | | | | | 2 | 1,800 |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | 2 | 550 | 6 | 1,800 | 5 | 900 | 48 | 16,280 |
| Gill nets, drift | 165 | 14,176 | 114 | 9,000 | 72 | 3,000 | 2,818 | 523,331 |
| Gill nets, set | 46 | 1,120 | 120 | 3,600 | 116 | 2,389 | 1,122 | 27,614 |
| Diver nets | | | | | | | 118 | 22,375 |
| Pound, or trap, nets | | | | | | | 21 | 25,750 |
| Wheels, stationary | | | | | | | 26 | 313,000 |
| Wheels, scow | | | | | | | 9 | 22,000 |
| Shore and accessory property | | 46,000 | | 21,400 | | 107,850 | | 1,554,780 |
| Cash capital | | 17,000 | | 25,000 | | 15,000 | | 551,500 |
| Total | | 123,261 | | 67,630 | | 147,709 | | 3,641,775 |

*Catch.*—The Columbia River produces more than two-thirds of the total catch, the Siuslaw River is second, and Coos Bay third. Bluebacks are taken on the Columbia River alone. The gill net is the only form of apparatus employed in most of the rivers.

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY APPARATUS, SPECIES, AND WATERS, IN 1909.

| Apparatus and species. | Columbia River. | | Nehalem River. | | Tillamook Bay. | | Nestucca River. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| HAUL SEINES. | | | | | | | | |
| Blueback, or sockeye | 54,781 | $2,495 | | | | | | |
| Chinook, or king, fresh | 849,761 | 50,704 | | | | | | |
| Dog, or chum | 24,000 | 150 | | | | | | |
| Silver, or coho | 264,022 | 5,287 | | | | | | |
| Steelhead trout | 619,417 | 29,827 | | | | | | |
| Total | 1,811,981 | 88,463 | | | | | | |
| GILL NETS. | | | | | | | | |
| Blueback, or sockeye | 1,000 | 50 | | | | | | |
| Chinook, or king, fresh | 10,064,279 | 553,762 | 50,284 | $1,509 | 314,810 | $7,870 | 52,733 | $2,537 |
| Dog, or chum | 94,248 | 599 | | | 259,856 | 1,299 | | |
| Silver, or coho | 296,269 | 6,419 | 206,826 | 5,171 | 146,592 | 3,665 | 68,169 | 3,408 |
| Steelhead trout | 314,471 | 15,171 | 63,624 | 318 | 5,000 | 100 | | |
| Total | 10,770,267 | 576,001 | 320,734 | 6,998 | 726,258 | 12,934 | 120,902 | 5,945 |
| DIVER NETS. | | | | | | | | |
| Chinook, or king, fresh | 620,257 | 38,653 | | | | | | |
| Steelhead trout | 1,800 | 90 | | | | | | |
| Total | 622,057 | 38,743 | | | | | | |
| POUND NETS. | | | | | | | | |
| Blueback, or sockeye | 25,020 | 1,126 | | | | | | |
| Chinook, or king, fresh | 57,060 | 2,606 | | | | | | |
| Dog, or chum | 149,260 | 774 | | | | | | |
| Silver, or coho | 562,220 | 11,644 | | | | | | |
| Steelhead trout | 46,210 | 2,311 | | | | | | |
| Total | 839,770 | 18,461 | | | | | | |
| WHEELS. | | | | | | | | |
| Blueback, or sockeye | 763,523 | 31,032 | | | | | | |
| Chinook, or king, fresh | 724,375 | 42,611 | | | | | | |
| Silver, or coho | 270,622 | 5,599 | | | | | | |
| Steelhead trout | 336,267 | 15,514 | | | | | | |
| Total | 2,094,787 | 94,756 | | | | | | |
| TOTAL. | | | | | | | | |
| Blueback, or sockeye | 844,324 | 34,703 | | | | | | |
| Chinook, or king, fresh | 12,315,732 | 688,336 | 50,284 | 1,509 | 314,810 | 7,870 | 52,733 | 2,537 |
| Dog, or chum | 267,508 | 1,523 | | | 259,856 | 1,299 | | |
| Silver, or coho | 1,393,133 | 28,949 | 206,826 | 5,171 | 146,592 | 3,665 | 68,169 | 3,408 |
| Steelhead trout | 1,318,165 | 62,913 | 63,624 | 318 | 5,000 | 100 | | |
| Grand total | 16,138,862 | 816,424 | 320,734 | 6,998 | 726,258 | 12,934 | 120,902 | 5,945 |

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

| Apparatus and species. | Siletz River. | | Yaquina Bay and River. | | Alsea Bay and River. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | |
| Chinook, or king, fresh | 53,690 | $2,148 | 33,722 | $1,532 | 167,856 | $8,393 |
| Dog, or chum | | | 42,640 | 267 | 29,720 | 186 |
| Silver, or coho | | | 246,738 | 6,752 | 333,444 | 10,003 |
| Steelhead trout | | | | | 6,200 | 248 |
| Total | 53,690 | 2,148 | 323,100 | 8,551 | 537,220 | 18,830 |
| TOTAL. | | | | | | |
| Chinook, or king, fresh | 53,690 | 2,148 | 33,722 | 1,532 | 167,856 | 8,393 |
| Dog, or chum | | | 42,640 | 267 | 29,720 | 186 |
| Silver, or coho | | | 246,738 | 6,752 | 333,444 | 10,003 |
| Steelhead trout | | | | | 6,200 | 248 |
| Grand total | 53,690 | 2,148 | 323,100 | 8,551 | 537,220 | 18,830 |

| Apparatus and species. | Siuslaw River. | | Umpqua River. | | Coos Bay. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| HAUL SEINES. | | | | | | |
| Chinook, or king, fresh | 5,000 | $125 | | | 12,100 | $363 |
| Silver, or coho | 8,000 | 200 | | | 39,000 | 975 |
| Steelhead trout | | | | | 3,900 | 78 |
| Total | 13,000 | 325 | | | 55,000 | 1,416 |
| GILL NETS. | | | | | | |
| Chinook, or king, fresh | 82,304 | 2,057 | 62,912 | $1,573 | 100,181 | 2,812 |
| Chinook, or king, salted | 12,000 | 480 | | | | |
| Dog, or chum | | | 36,000 | 225 | | |
| Silver, or coho | 970,348 | 24,256 | 351,072 | 8,728 | 660,240 | 16,506 |
| Steelhead trout | | | 13,000 | 260 | 49,000 | 980 |
| Total | 1,064,652 | 26,793 | 462,984 | 10,786 | 809,421 | 20,298 |
| TOTAL. | | | | | | |
| Chinook, or king, fresh | 87,304 | 2,182 | 62,912 | 1,573 | 112,281 | 3,175 |
| Chinook, or king, salted | 12,000 | 480 | | | | |
| Dog, or chum | | | 36,000 | 225 | | |
| Silver, or coho | 978,348 | 24,456 | 351,072 | 8,728 | 699,240 | 17,481 |
| Steelhead trout | | | 13,000 | 260 | 52,900 | 1,058 |
| Grand total | 1,077,652 | 27,118 | 462,984 | 10,786 | 864,421 | 21,714 |

PRODUCTS OF THE SALMON FISHERIES OF OREGON, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

| Apparatus and species. | Coquille River. | | Rogue River. | | Total. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| HAUL SEINES. | | | | | | |
| Blueback, or sockeye | | | | | 54,781 | $2,495 |
| Chinook, or king, fresh | 4,100 | $103 | 30,900 | $622 | 901,861 | 51,917 |
| Dog, or chum | | | | | 24,000 | 150 |
| Silver, or coho | 137,452 | 3,436 | | | 448,474 | 9,898 |
| Steelhead trout | | | | | 623,317 | 29,905 |
| Total | 141,552 | 3,539 | 30,900 | 622 | 2,052,433 | 94,365 |
| GILL NETS. | | | | | | |
| Blueback, or sockeye | | | | | 1,000 | 50 |
| Chinook, or king, fresh | 27,400 | 685 | 627,090 | 15,311 | 11,637,261 | 600,189 |
| Chinook, or king, salted | | | | | 12,000 | 480 |
| Dog, or chum | | | | | 526,088 | 2,894 |
| Silver, or coho | 549,808 | 13,745 | 73,698 | 1,410 | 3,903,204 | 100,063 |
| Steelhead trout | 6,000 | 120 | 109,020 | 2,103 | 502,691 | 18,982 |
| Total | 583,208 | 14,550 | 809,808 | 18,824 | 16,582,244 | 722,658 |
| DIVER NETS. | | | | | | |
| Chinook, or king, fresh | | | | | 620,257 | 38,653 |
| Steelhead trout | | | | | 1,800 | 90 |
| Total | | | | | 622,057 | 38,743 |
| POUND NETS. | | | | | | |
| Blueback, or sockeye | | | | | 25,020 | 1,126 |
| Chinook, or king, fresh | | | | | 57,060 | 2,606 |
| Dog, or chum | | | | | 149,260 | 774 |
| Silver, or coho | | | | | 562,220 | 11,644 |
| Steelhead trout | | | | | 46,210 | 2,311 |
| Total | | | | | 839,770 | 18,461 |
| WHEELS. | | | | | | |
| Blueback, or sockeye | | | | | 763,523 | 31,032 |
| Chinook, or king, fresh | | | | | 724,375 | 42,611 |
| Silver, or coho | | | | | 270,622 | 5,599 |
| Steelhead trout | | | | | 336,267 | 15,514 |
| Total | | | | | 2,094,787 | 94,756 |
| TOTAL. | | | | | | |
| Blueback, or sockeye | | | | | 844,324 | 34,703 |
| Chinook, or king, fresh | 31,500 | 788 | 657,990 | 15,933 | 13,940,814 | 735,976 |
| Chinook, or king, salted | | | | | 12,000 | 480 |
| Dog, or chum | | | | | 635,724 | 3,500 |
| Silver, or coho | 687,260 | 17,181 | 73,698 | 1,410 | 5,184,520 | 127,204 |
| Steelhead trout | 6,000 | 120 | 109,020 | 2,103 | 1,573,909 | 67,120 |
| Grand total | 724,760 | 18,089 | 840,708 | 19,446 | 22,191,291 | 968,983 |

*Products canned.*—As in other branches of the industry the Columbia River leads, producing more than two-thirds of the pack of canned salmon. But little was done on the Rogue River, owing to the recent death of Mr. R. D. Hume, owner of the principal cannery. Bluebacks and steelheads were packed on the Columbia River alone. All of the humpbacks and part of the sockeyes packed on the Columbia River were brought from Puget Sound, Wash.

## Pack of Canned Salmon in Oregon, by Waters, in 1909.

| Products. | Columbia River. | | Nehalem River. | | Tillamook Bay. | | Yaquina River and Bay. | |
|---|---|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Blueback, or sockeye: | | | | | | | | |
| ½-pound flat | a 32,071 | $133,095 | | | | | | |
| 1-pound flat | 6,645 | 39,870 | | | | | | |
| 1-pound tall | b 50 | 320 | | | | | | |
| Total | 38,766 | 173,285 | | | | | | |
| Chinook, or king: | | | | | | | | |
| ½-pound flat | 67,386 | 283,021 | 228 | $684 | 965 | $2,895 | | |
| 1-pound flat | 53,990 | 393,517 | | | | | | |
| 1-pound tall | 17,453 | 115,191 | 1,643 | 9,858 | 2,128 | 12,768 | | |
| ½-pound oval | 534 | 2,670 | | | | | | |
| 1-pound oval | 809 | 7,930 | | | | | | |
| 2-pound nominal | 458 | 1,833 | | | | | | |
| Total | 140,630 | 804,162 | 1,871 | 10,542 | 3,093 | 15,663 | | |
| Chum, or dog: | | | | | | | | |
| 1-pound tall | 4,491 | 10,329 | 909 | 2,091 | 3,712 | 8,538 | 33 | $76 |
| Humpback, or pink: | | | | | | | | |
| 1-pound tall | c 55 | 132 | | | | | | |
| Silverside, coho, or white: | | | | | | | | |
| ½-pound flat | 3,304 | 9,252 | 2,546 | 7,129 | 2,119 | 5,933 | | |
| 1-pound flat | 8,220 | 36,155 | | | | | | |
| 1-pound tall | 5,817 | 23,850 | 3,281 | 13,124 | 3,969 | 15,876 | 1,139 | 4,556 |
| Total | 17,341 | 69,257 | 5,827 | 20,253 | 6,088 | 21,809 | 1,139 | 4,556 |
| Steelhead trout: | | | | | | | | |
| ½-pound flat | 7,064 | 22,084 | | | | | | |
| 1-pound flat | 1,365 | 7,695 | | | | | | |
| 1-pound tall | 4,320 | 25,056 | | | | | | |
| Total | 12,749 | 54,835 | | | | | | |
| Grand total | 214,032 | 1,112,000 | 8,607 | 32,886 | 12,893 | 46,010 | 1,172 | 4,632 |

| Products. | Alsea River and Bay. | | Siuslaw River. | | Umpqua River. | | Coos Bay. | |
|---|---|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Chinook, or king: | | | | | | | | |
| ½-pound flat | 928 | $2,784 | | | | | 50 | $150 |
| 1-pound flat | | | | | | | 211 | 1,013 |
| 1-pound tall | 655 | 3,930 | 632 | $3,792 | 500 | $3,000 | | |
| 1-pound oval | | | | | | | 39 | 312 |
| Total | 1,583 | 6,714 | 632 | 3,792 | 500 | 3,000 | 300 | 1,475 |
| Chum, or dog: | | | | | | | | |
| 1-pound tall | 80 | 184 | | | | | | |
| Silverside, coho, or white: | | | | | | | | |
| ½-pound flat | 2,601 | 7,283 | 4,017 | 11,248 | | | 2,088 | 5,846 |
| 1-pound flat | | | | | | | 1,841 | 8,100 |
| 1-pound tall | 4,186 | 16,744 | 5,427 | 21,708 | 7,753 | 31,012 | 759 | 3,036 |
| 2-pound nominal | | | | | | | 315 | 945 |
| Total | 6,787 | 24,027 | 9,444 | 32,956 | 7,753 | 31,012 | 5,003 | 17,927 |
| Grand total | 8,450 | 30,925 | 10,076 | 36,748 | 8,253 | 34,012 | 5,303 | 19,402 |

a Of these, 4,595 cases, valued at $18,696, were filled with sockeyes brought from Puget Sound, Wash.
b Packed with sockeye salmon from Puget Sound, Wash.
c Packed with humpback salmon from Puget Sound, Wash.

PACK OF CANNED SALMON IN OREGON, BY WATERS, IN 1909—Continued.

| Products. | Coquille River. | | Rogue River. | | Total. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Blueback, or sockeye: | | | | | | |
| ½-pound flat | | | | | 32,071 | $133,095 |
| 1-pound flat | | | | | 6,645 | 39,870 |
| 1-pound tall | | | | | 50 | 320 |
| Total | | | | | 38,766 | 173,285 |
| Chinook, or king: | | | | | | |
| ½-pound flat | | | | | 69,557 | 289,534 |
| 1-pound flat | 204 | $979 | 186 | $1,300 | 54,591 | 396,809 |
| 1-pound tall | 46 | 276 | | | 23,057 | 148,815 |
| ½-pound oval | | | | | 534 | 2,670 |
| 1-pound oval | | | | | 848 | 8,242 |
| 2-pound nominal | | | | | 458 | 1,833 |
| Total | 250 | 1,255 | 186 | 1,300 | 149,045 | 847,903 |
| Chum, or dog: | | | | | | |
| 1-pound tall | | | | | 9,225 | 21,218 |
| Humpback, or pink: | | | | | | |
| 1-pound tall | | | | | 55 | 132 |
| Silverside, coho, or white: | | | | | | |
| ½-pound flat | 3,656 | 10,237 | | | 20,331 | 56,928 |
| 1-pound flat | 1,226 | 5,394 | 468 | 2,053 | 11,755 | 51,702 |
| 1-pound tall | 6,764 | 27,056 | 231 | 924 | 39,326 | 157,886 |
| 2-pound nominal | | | | | 315 | 945 |
| Total | 11,646 | 42,687 | 699 | 2,977 | 71,727 | 267,461 |
| Steelhead trout: | | | | | | |
| ½-pound flat | | | | | 7,064 | 22,084 |
| 1-pound flat | | | | | 1,365 | 7,695 |
| 1-pound tall | | | | | 4,320 | 25,056 |
| Total | | | | | 12,749 | 54,835 |
| Grand total | 11,896 | 43,942 | 885 | 4,277 | [a] 281,567 | 1,364,834 |

[a] All 1-pound cases contain 48 1-pound cans; the ½-pound cases contain 48 ½-pound cans. Reduced to a common basis of 48 1-pound cans the pack is 216,788½ cases.

*Miscellaneous secondary products.*—The Columbia River produces a large part of the miscellaneous secondary products. Mild-cured salmon form the greater part of the pack, followed by frozen, smoked, and pickled salmon in the order named.

PACK OF MISCELLANEOUS SECONDARY PRODUCTS IN OREGON, BY WATERS, IN 1909.

| Products. | Columbia River. | | Nehalem River. | | Tillamook Bay. | | Siletz River. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | | | | | |
| Chinook | 14,000 | $1,400 | | | | | | |
| Silverside | 216,175 | 13,868 | | | | | | |
| Steelhead trout | 1,414,662 | 141,767 | | | | | | |
| Total | 1,644,837 | 157,035 | | | | | | |
| Mild-cured: | | | | | | | | |
| Chinook | 3,909,846 | 390,984 | 15,485 | $1,239 | 59,595 | $4,768 | 41,575 | $4,003 |
| Smoked: | | | | | | | | |
| Chinook | 127,700 | 19,155 | | | | | | |
| Silverside | 20,000 | 2,000 | | | | | | |
| Total | 147,700 | 21,155 | | | | | | |
| Grand total | 5,702,383 | 569,174 | 15,485 | 1,239 | 59,595 | 4,768 | 41,575 | 4,003 |

PACK OF MISCELLANEOUS SECONDARY PRODUCTS IN OREGON, BY WATERS, IN 1909—Continued.

| Products. | Alsea River and Bay. | | Siuslaw River. | | Umpqua River. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Mild-cured: | | | | | | |
| Chinook | 32,386 | $3,158 | 12,000 | $960 | 4,002 | $240 |
| Pickled: | | | | | | |
| Chinook | | | 400 | 24 | | |
| Silverside | | | 2,600 | 130 | | |
| Total | | | 3,000 | 154 | | |
| Grand total | 32,386 | 3,158 | 15,000 | 1,114 | 4,002 | 240 |

| Products. | Coos Bay. | | Rogue River. | | Total. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | | | |
| Chinook | | | | | 14,000 | $1,400 |
| Silverside | | | | | 216,175 | 13,868 |
| Steelhead trout | | | 32,023 | $2,891 | 1,446,685 | 144,658 |
| Total | | | 32,023 | 2,891 | 1,676,860 | 159,926 |
| Mild-cured: | | | | | | |
| Chinook | 48,000 | $4,800 | 242,553 | 24,673 | 4,365,442 | 434,825 |
| Pickled: | | | | | | |
| Chinook | | | | | 400 | 24 |
| Silverside | | | | | 2,600 | 130 |
| Total | | | | | 3,000 | 154 |
| Smoked: | | | | | | |
| Chinook | | | | | 127,700 | 19,155 |
| Silverside | | | | | 20,000 | 2,000 |
| Total | | | | | 147,700 | 21,155 |
| Grand total | 48,000 | 4,800 | 274,576 | 27,564 | 6,193,002 | 616,060 |

## CALIFORNIA.

In Eel River the runs of all species of salmon were very poor. For the first few days of the season the catch was very heavy, after which the run dwindled down to almost nothing. Nearly all of these were shipped fresh to San Francisco, where the dealers claimed that most of them arrived in bad condition.

In the Sacramento River the run was a very fair one, and all of the product was marketed in either a fresh, mild-cured, or smoked condition, none being canned. The interesting table following shows the daily deliveries of chinook salmon to one of the mild-curing plants on the river, and the total and average weights of same.

DAILY DELIVERIES OF CHINOOK SALMON TO A MILD-CURING PLANT ON THE SACRAMENTO RIVER, SEASON OF 1909.

| Date. | Number. | Total weight. | Average. |
|---|---|---|---|
| SPRING, 1909. | | | |
| Apr. 16 | 21 | 421 | 20.0 |
| 17 | 13 | 297 | 22.0 |
| 19 | 109 | 2,411 | 22.0 |
| 20 | 305 | 7,512 | 24.6 |
| 21 | 111 | 2,826 | 25.4 |
| 22 | 183 | 4,510 | 24.6 |
| 23 | 331 | 7,708 | 23.2 |
| 24 | 163 | 3,919 | 24.0 |
| 26 | 284 | 5,918 | 23.8 |
| 27 | 75 | 1,788 | 23.8 |
| 28 | 104 | 2,391 | 23.0 |
| 29 | 116 | 2,716 | 23.2 |
| 30 | 358 | 8,059 | 23.0 |
| May 1 | 251 | 5,739 | 22.8 |
| 3 | 171 | 4,016 | 23.4 |
| 4 | 175 | 4,128 | 23.5 |
| 5 | 107 | 2,490 | 22.6 |
| 6 | 66 | 1,680 | 25.4 |
| 7 | 132 | 2,957 | 22.4 |
| 8 | 96 | 2,287 | 23.8 |
| 10 | 308 | 7,302 | 23.3 |
| 12 | 152 | 3,717 | 24.4 |
| 13 | 89 | 2,056 | 23.1 |
| 14 | 274 | 6,635 | 24.2 |
| 15 | 254 | 6,201 | 24.4 |
| 17 | 310 | 7,378 | 23.8 |
| 18 | 323 | 7,844 | 24.2 |
| 19 | 210 | 5,037 | 23.9 |
| 20 | 226 | 5,246 | 23.2 |
| 21 | 154 | 3,778 | 24.5 |
| 22 | 166 | 4,150 | 25.0 |
| 24 | 315 | 7,290 | 23.1 |
| 25 | 422 | 9,917 | 23.5 |
| 26 | 342 | 7,767 | 22.7 |
| 27 | 245 | 5,900 | 24.0 |
| 28 | 268 | 6,496 | 24.2 |
| 29 | 197 | 4,826 | 24.5 |
| 30 | 330 | 7,529 | 22.8 |
| June 1 | 299 | 7,250 | 24.2 |
| Total | 8,019 | 190,092 | 23.7 |

| Date. | Number. | Total weight. | Average. |
|---|---|---|---|
| FALL, 1909. | | | |
| Aug. 17 | 279 | 6,658 | 23.8 |
| 18 | 325 | 8,021 | 24.6 |
| 19 | 147 | 4,018 | 27.3 |
| 20 | 185 | 4,954 | 26.7 |
| 21 | 39 | 1,011 | 25.9 |
| 23 | 1,731 | 42,829 | 24.7 |
| 24 | 458 | 11,888 | 26.0 |
| 25 | 279 | 7,444 | 26.7 |
| 26 | 315 | 8,250 | 26.0 |
| 27 | 145 | 3,747 | 25.8 |
| 28 | 86 | 2,309 | 28.0 |
| 30 | 1,300 | 32,926 | 25.3 |
| 31 | 812 | 21,018 | 25.8 |
| Sept. 1 | 628 | 16,331 | 26.0 |
| 2 | 356 | 9,654 | 27.1 |
| 3 | 242 | 6,582 | 27.1 |
| 4 | 105 | 2,885 | 27.4 |
| 6 | 1,176 | 31,640 | 26.9 |
| 7 | 915 | 24,277 | 26.5 |
| 8 | 758 | 19,874 | 26.2 |
| 9 | 704 | 18,851 | 26.7 |
| 10 | 677 | 18,204 | 26.8 |
| 11 | 369 | 9,592 | 26.0 |
| 13 | 1,917 | 49,781 | 25.9 |
| 14 | 1,343 | 35,555 | 26.4 |
| 15 | 751 | 20,097 | 26.7 |
| 16 | 647 | 17,328 | 26.7 |
| 17 | 1,493 | 35,883 | 24.0 |
| Total | 18,182 | 471,607 | 25.9 |
| Grand total | 26,201 | 661,699 | 25.45 |

The southernmost point on our coast where salmon are taken commercially is in Monterey Bay, and it is here that trolling was first engaged in to any extent. Yearly the chinooks come into Monterey and Santa Cruz Bays, where they sometimes remain feeding for months. When they strike in, which in numbers they usually do the latter part of April, they are in the pursuit of squid, sardines, anchovies, and other small fish, and their presence is first indicated to the fishermen by the occasional disturbances of the surface by the small fish. It is a signal for the fishermen and sportsmen, who go out in both sail and row boats.

During 1909 most of the catch was made in the vicinity of Monterey, the salmon appearing in but small numbers in Santa Cruz Bay.

While evidently coming in schools at first, salmon soon scatter about in pursuit of their prey, thus making the use of nets unprofitable. In a dead calm troll fishing practically ceases, but with the return of the breeze the fish resume biting.

The silver salmon come into Monterey Bay in July and are usually taken in that one month alone. Some of them run as large as 12 to 13 pounds each and all are feeding.

During 1909 the dealers had an agreement with their fishermen, who are mostly Japanese, under which they kept back a certain percentage of the price until the end of the season. This was done in order to make certain that the fishermen would not go off and sell to some one else the better fish and bring them the poorer quality.

The following table shows the daily receipts of chinook salmon at the mild-curing plant of one of the companies operating at Monterey during 1909. The table also shows the number of boats fishing, the number of fish caught, and the total weight of same, and the average weight per fish:

DAILY DELIVERIES OF CHINOOK SALMON AT A MILD-CURING PLANT ON MONTEREY BAY, SEASON OF 1909.

| Date. | Number of boats. | Number of fish. | Total weight. | Average weight. | Date. | Number of boats. | Number of fish. | Total. weight. | Average weight. |
|---|---|---|---|---|---|---|---|---|---|
| 1909. | | | | | 1909. | | | | |
| Apr. 30 | 70 | 966 | 10,002 | 18.3 | June 21 | 106 | 1,808 | 30,090 | 16.6 |
| May 1 | 69 | 319 | 4,096 | 12.8 | 22 | 110 | 1,678 | 20,576 | 12.2 |
| 3 | 12 | 20 | 369 | 18.4 | 23 | 104 | 1,135 | 15,964 | 14.0 |
| 4–5 | 30 | 152 | 2,512 | 16.5 | 24 | 111 | 1,811 | 26,826 | 14.5 |
| 6 | 41 | 126 | 1,758 | 14.0 | 25 | 100 | 595 | 9,549 | 16.0 |
| 7 | 35 | 93 | 1,084 | 11.6 | 26 | 108 | 615 | 9,645 | 15.0 |
| 8 | 23 | 47 | 602 | 13.0 | 27 | 46 | 142 | 1,831 | 12.7 |
| 10 | 15 | 47 | 633 | 13.0 | 28 | 44 | 212 | 2,719 | 12.8 |
| 11 | 28 | 56 | 770 | 13.4 | 29 | 88 | 566 | 7,030 | 12.5 |
| 12 | 82 | 642 | 8,210 | 12.5 | 30 | 101 | 1,175 | 14,499 | 13.0 |
| 13 | 83 | 613 | 6,250 | 10.2 | July 1 | 111 | 1,416 | 18,363 | 13.0 |
| 14 | 93 | 847 | 9,993 | 11.8 | 2 | 100 | 634 | 8,576 | 13.5 |
| 15 | 103 | 615 | 7,835 | 12.7 | 3 | 108 | 1,313 | 16,060 | 12.2 |
| 16 | 16 | 26 | 429 | 16.0 | 6 | 113 | 1,687 | 24,508 | 15.0 |
| 17 | 107 | 1,152 | 14,612 | 12.7 | 7 | 114 | 1,568 | 20,054 | 13.0 |
| 18 | 87 | 318 | 4,607 | 15.0 | 8 | 116 | 1,428 | 20,401 | 14.25 |
| 19 | 63 | 135 | 1,673 | 12.5 | 9 | 80 | 971 | 13,350 | 14.0 |
| 22 | 31 | 46 | 667 | 15.0 | 10 | 114 | 973 | 13,236 | 13.5 |
| 23 | 82 | 476 | 6,043 | 12.7 | 11 | 88 | 581 | 8,184 | 14.0 |
| 24 | 107 | 1,652 | 23,600 | 14.3 | 12 | 79 | 400 | 5,196 | 13.0 |
| 25 | 114 | 3,390 | 50,621 | 15.0 | 13 | 62 | 407 | 4,847 | 12.0 |
| 26 | 118 | 1,190 | 17,590 | 12.0 | 14 | 91 | 466 | 5,469 | 11.7 |
| 27 | 54 | 94 | 1,619 | 17.0 | 15 | 98 | 513 | 6,166 | 12.0 |
| 28 | 68 | 222 | 3,458 | 15.5 | 16 | 85 | 495 | 5,713 | 11.6 |
| 29 | 93 | 650 | 9,874 | 15.5 | 17 | 85 | 506 | 5,697 | 11.25 |
| 30 | 118 | 2,852 | 38,567 | 13.5 | 19 | 55 | 257 | 3,187 | 12.4 |
| 31 | 119 | 1,005 | 14,625 | 14.0 | 20 | 91 | 422 | 5,565 | 13.1 |
| June 1 | 95 | 493 | 8,273 | 17.0 | 21 | 62 | 205 | 3,252 | 15.75 |
| 2 | 115 | 1,245 | 20,256 | 17.0 | 22 | 68 | 356 | 5,178 | 15.0 |
| 3 | 109 | 1,000 | 14,304 | 14.0 | 23 | 79 | 460 | 6,237 | 13.5 |
| 4 | 112 | 724 | 10,437 | 14.0 | 24 | 95 | 1,284 | 15,391 | 12.0 |
| 5 | 96 | 1,615 | 22,571 | 14.0 | 26 | 108 | 1,176 | 16,437 | 14.0 |
| 6 | 114 | 988 | 12,901 | 13.0 | 27 | 104 | 1,487 | 22,766 | 15.30 |
| 7 | 95 | 485 | 7,042 | 14.5 | 28 | 105 | 961 | 18,576 | 19.5 |
| 8 | 80 | 307 | 4,804 | 16.0 | 29 | 88 | 267 | 5,521 | 20.7 |
| 9 | 68 | 200 | 3,437 | 17.0 | 30 | 59 | 114 | 2,548 | 22.7 |
| 10 | 66 | 243 | 4,786 | 22.0 | 31 | 47 | 144 | 2,832 | 19.9 |
| 11 | 83 | 348 | 6,187 | 19.0 | Aug. 2 | 79 | 287 | 4,908 | 17.0 |
| 12 | 95 | 623 | 10,218 | 16.0 | 3 | 43 | 78 | 1,574 | 20.0 |
| 13 | 106 | 499 | 7,965 | 16.0 | 4 | 21 | 71 | 1,366 | 19.0 |
| 14 | 89 | 390 | 6,655 | 18.0 | 5 | 43 | 170 | 3,546 | 20.9 |
| 15 | 112 | 1,729 | 27,524 | 16.0 | 6 | 70 | 274 | 4,845 | 18.0 |
| 16 | 115 | 3,092 | 48,138 | 15.4 | 7 | 52 | 114 | 2,156 | 19.0 |
| 17 | 105 | 1,395 | 24,436 | 17.6 | 9–12 | 12 | 20 | 502 | 25.0 |
| 18 | 117 | 3,725 | 61,789 | 16.7 | | | | | |
| 19 | 112 | 2,083 | 35,265 | 17.0 | Total | | 71,619 | 1,043,358 | 14.6 |
| 20 | 111 | 1,442 | 23,335 | 16.2 | | | | | |

## STATISTICS BY COUNTIES.

*Persons employed.*—The total number of persons employed was 2,675, Contra Costa County leading with 774 persons.

PERSONS ENGAGED IN THE CALIFORNIA SALMON FISHERIES, BY COUNTIES, IN 1909.

| Counties. | Fishermen. | | | | Shoresmen.[a] | | | | Transporters (whites). | Grand total. |
|---|---|---|---|---|---|---|---|---|---|---|
| | Whites. | Japanese. | Chinese. | Total. | Whites. | Indians. | Japanese. | Total. | | |
| Del Norte | 84 | | | 84 | 17 | 15 | | 32 | 3 | 119 |
| Humboldt | 339 | | | 339 | 19 | | | 19 | | 358 |
| Alameda | | | | | 25 | | | 25 | | 25 |
| Marin | 8 | | | 8 | | | | | | 8 |
| San Francisco | 60 | | | 60 | 60 | | | 60 | 8 | 128 |
| Solano | 420 | | | 420 | 50 | | | 50 | 24 | 494 |
| Contra Costa | 654 | | | 654 | 78 | | | 78 | 42 | 774 |
| San Joaquin | 64 | 24 | | 88 | | | | | | 88 |
| Yolo | 42 | | | 42 | | | | | | 42 |
| Sacramento | 178 | | | 178 | | | | | | 178 |
| Sutter | 12 | | | 12 | | | | | | 12 |
| Butte | 45 | | | 45 | | | | | 5 | 50 |
| Glenn | 20 | | | 20 | 1 | | | 1 | | 21 |
| Tehama | 45 | | | 45 | | | 5 | 5 | | 50 |
| Shasta | 10 | | | 10 | | | | | | 10 |
| Monterey | 65 | 144 | 15 | 224 | 26 | | | 26 | | 250 |
| Santa Cruz | 68 | | | 68 | | | | | | 68 |
| Total | 2,114 | 168 | 15 | 2,297 | 276 | 15 | 5 | 296 | 82 | 2,675 |

[a] All the shoresmen reported for Alameda County and part of those reported for San Francisco County are employed by one of the Alaskan canning companies and have been reported here, as they are employed here the whole year.

*Investment, apparatus, etc.*—The total investment amounts to $1,232,960. The shore property reported for Alameda County belongs to one of the companies operating in Alaska. Contra Costa leads in the total investment. Gill nets, haul seines, and trolling lines are the principal forms of apparatus in use.

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY COUNTIES, IN 1909.

| Items. | Del Norte. | | Humboldt. | | Alameda. | | Marin. | | San Francisco. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 1 | $3,248 | | | | | | | 1 | $25,000 |
| Tonnage | 9 | | | | | | | | 32 | |
| Outfit | | 750 | | | | | | | | 1,240 |
| Power boats | | | | | | | | | 4 | 7,000 |
| Fishing boats, power | | | | | | | | | 15 | 18,000 |
| Fishing boats, sail and row | 54 | 2,640 | 253 | $6,625 | | | 4 | $400 | 15 | 1,500 |
| House boats and scows | | | 2 | 100 | | | | | | |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Haul seines | 4 | 550 | 17 | 2,450 | | | | | | |
| Gill nets, drift | 50 | 11,300 | 286 | 19,375 | | | 4 | 1,050 | 30 | 7,875 |
| Shore and accessory property | | 17,020 | | 7,750 | | $159,550 | | 50 | | 155,320 |
| Cash capital | | 10,000 | | 4,500 | | | | | | 43,500 |
| Total | | 45,508 | | 40,800 | | 159,550 | | 1,500 | | 259,435 |

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY COUNTIES, IN 1909—Continued.

| Items. | Solano. | | Contra Costa. | | San Joaquin. | | Yolo. | | Sacramento. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | | | |
| Power vessels | 1 | $4,000 | 1 | $5,500 | ..... | ..... | ..... | ..... | ..... | ..... |
| Tonnage | 10 | ..... | 5 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Outfit | ..... | 1,000 | ..... | 930 | ..... | ..... | ..... | ..... | ..... | ..... |
| Power boats | 14 | 19,500 | 23 | 36,800 | ..... | ..... | ..... | ..... | ..... | ..... |
| Fishing boats, power | 30 | 10,400 | 32 | 21,000 | 28 | $8,400 | 4 | $1,600 | 17 | $6,800 |
| Fishing boats, sail and row | 183 | 36,400 | 300 | 58,500 | 16 | 2,900 | 17 | 990 | 77 | 5,170 |
| House boats and scows | 10 | 4,000 | 11 | 4,800 | ..... | ..... | 5 | 1,000 | 19 | 3,650 |
| Apparatus, shore fisheries: | | | | | | | | | | |
| Gill nets, drift | 210 | 39,500 | 322 | 64,400 | 44 | 6,600 | 21 | 2,550 | 113 | 14,320 |
| Hand lines | ..... | ..... | ..... | 10 | ..... | ..... | ..... | ..... | ..... | ..... |
| Shore and accessory property | ..... | 29,900 | ..... | 117,113 | ..... | 580 | ..... | 145 | ..... | 815 |
| Cash capital | ..... | 50,000 | ..... | 85,000 | ..... | ..... | ..... | ..... | ..... | ..... |
| Total | ..... | 194,700 | ..... | 394,053 | ..... | 18,480 | ..... | 6,285 | ..... | 30,755 |

| Items. | Sutter. | | Butte. | | Glenn. | | Tehama. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Apparatus, shore fisheries: | | | | | | | | |
| Fishing boats, sail and row | 6 | $375 | 20 | $840 | 6 | $300 | 20 | $1,000 |
| House boats and scows | 3 | 375 | ..... | ..... | ..... | ..... | ..... | ..... |
| Haul seines | ..... | ..... | 10 | 1,000 | 4 | 400 | 10 | 1,020 |
| Gill nets, drift | 6 | 600 | ..... | ..... | ..... | ..... | ..... | ..... |
| Shore and accessory property | ..... | 50 | ..... | 2,075 | ..... | 600 | ..... | 2,150 |
| Total | ..... | 1,400 | ..... | 3,915 | ..... | 1,300 | ..... | 4,170 |

| Items. | Shasta. | | Monterey. | | Santa Cruz. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | ..... | ..... | ..... | ..... | ..... | ..... | 4 | $37,748 |
| Tonnage | ..... | ..... | ..... | ..... | ..... | ..... | 56 | ..... |
| Outfit | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3,920 |
| Power boats | ..... | ..... | ..... | ..... | ..... | ..... | 41 | 63,300 |
| Fishing boats, power | ..... | ..... | 24 | $13,850 | 21 | $11,000 | 171 | 91,050 |
| Fishing boats, sail and row | 4 | $200 | 170 | 7,805 | 13 | 2,600 | 1,158 | 128,245 |
| House boats and scows | ..... | ..... | ..... | ..... | ..... | ..... | 50 | 13,925 |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | 2 | 230 | ..... | ..... | ..... | ..... | [a] 47 | 5,650 |
| Gill nets, drift | ..... | ..... | ..... | ..... | ..... | ..... | [b] 1,086 | 167,570 |
| Trolling lines | ..... | ..... | ..... | 886 | ..... | 263 | ..... | 1,149 |
| Hand lines | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 10 |
| Shore and accessory property | ..... | 275 | ..... | 3,900 | ..... | 100 | ..... | 497,393 |
| Cash capital | ..... | ..... | ..... | 30,000 | ..... | ..... | ..... | 223,000 |
| Total | ..... | 705 | ..... | 56,441 | ..... | 13,963 | ..... | 1,232,960 |

[a] Aggregate length of 13,449 yards.

[b] Aggregate length of 438,420 yards.

*Catch.*—The total catch amounts to 12,141,937 pounds, valued at $585,995. Contra Costa County leads in catch, followed closely by Solano County. Nearly four-fifths of the catch was made with gill nets, while chinook salmon comprise almost all of the catch.

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS AND SPECIES, IN 1909.

| Apparatus and species. | Del Norte. | | Humboldt. | | Marin. | | San Francisco. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | | | |
| Blueback | | | 9,300 | $317 | | | | |
| Chinook, fresh | 524,225 | $8,532 | 463,649 | 16,970 | 5,380 | $310 | 91,063 | $4,055 |
| Chinook, salted | 27,000 | 1,220 | | | | | | |
| Silver, fresh | 50,000 | 900 | 23,000 | 690 | | | | |
| Silver, salted | 20,000 | 1,000 | | | | | | |
| Steelhead trout | | | 4,700 | 235 | | | | |
| Total | 621,225 | 11,652 | 500,649 | 18,212 | 5,380 | 310 | 91,063 | 4,055 |
| SEINES. | | | | | | | | |
| Blueback | | | 11,700 | 372 | | | | |
| Chinook, fresh | | | 301,600 | 12,064 | | | | |
| Chinook, salted | 10,000 | 400 | 32,049 | 2,932 | | | | |
| Silver, fresh | | | 12,000 | 360 | | | | |
| Silver, salted | 24,000 | 800 | 2,000 | 100 | | | | |
| Dog | | | 4,200 | 84 | | | | |
| Total | 34,000 | 1,200 | 363,549 | 15,912 | | | | |
| TOTAL. | | | | | | | | |
| Blueback | | | 21,000 | 689 | | | | |
| Chinook, fresh | 524,225 | 8,532 | 765,249 | 29,034 | 5,380 | 310 | 91,063 | 4,055 |
| Chinook, salted | 37,000 | 1,620 | 32,049 | 2,932 | | | | |
| Silver, fresh | 50,000 | 900 | 35,000 | 1,050 | | | | |
| Silver, salted | 44,000 | 1,800 | 2,000 | 100 | | | | |
| Dog | | | 4,200 | 84 | | | | |
| Steelhead trout | | | 4,700 | 235 | | | | |
| Grand total | 655,225 | 12,852 | 864,198 | 34,124 | 5,380 | 310 | 91,063 | 4,055 |

| Apparatus and species. | Solano. | | Contra Costa. | | San Joaquin. | | Yolo. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | | | |
| Chinook, fresh | 3,238,788 | $168,713 | 3,944,902 | $210,855 | 61,187 | $2,585 | 197,520 | $10,852 |
| Steelhead trout | | | 678 | 41 | | | | |
| Total | 3,238,788 | 168,713 | 3,945,580 | 210,896 | 61,187 | 2,585 | 197,520 | 10,852 |
| LINES. | | | | | | | | |
| Steelhead trout | | | 3,500 | 270 | | | | |
| Total | | | 3,500 | 270 | | | | |
| TOTAL. | | | | | | | | |
| Chinook, fresh | 3,238,788 | 168,713 | 3,944,902 | 210,855 | 61,187 | 2,585 | 197,520 | 10,852 |
| Steelhead trout | | | 4,178 | 311 | | | | |
| Grand total | 3,238,788 | 168,713 | 3,949,080 | 211,166 | 61,187 | 2,585 | 197,520 | 10,852 |

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS AND SPECIES, IN 1909—Continued.

| Apparatus and species. | Sacramento. | | Sutter. | | Butte. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | |
| Chinook, fresh | 599,723 | $32,690 | 62,119 | $1,917 | ..... | ..... |
| Total | 599,723 | 32,690 | 62,119 | 1,917 | ..... | ..... |
| SEINES. | | | | | | |
| Chinook, fresh | ..... | ..... | ..... | ..... | 163,022 | $8,285 |
| Total | ..... | ..... | ..... | ..... | 163,022 | 8,285 |
| TOTAL. | | | | | | |
| Chinook, fresh | 599,723 | 32,690 | 62,119 | 1,917 | 163,022 | 8,285 |
| Grand total | 599,723 | 32,690 | 62,119 | 1,917 | 163,022 | 8,285 |

| Apparatus and species. | Glenn. | | Tehama. | | Shasta. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| SEINES. | | | | | | |
| Chinook, fresh | 72,547 | $3,627 | 314,102 | $16,905 | 46,475 | $2,789 |
| Total | 72,547 | 3,627 | 314,102 | 16,905 | 46,475 | 2,789 |
| TOTAL. | | | | | | |
| Chinook, fresh | 72,547 | 3,627 | 314,102 | 16,905 | 46,475 | 2,789 |
| Grand total | 72,547 | 3,627 | 314,102 | 16,905 | 46,475 | 2,789 |

| Apparatus and species. | Monterey. | | Santa Cruz. | | Total. | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | |
| Blueback | ..... | ..... | ..... | ..... | 9,300 | $317 |
| Chinook, fresh | ..... | ..... | ..... | ..... | 9,188,556 | 457,479 |
| Chinook, salted | ..... | ..... | ..... | ..... | 27,000 | 1,220 |
| Silver, fresh | ..... | ..... | ..... | ..... | 73,000 | 1,590 |
| Silver, salted | ..... | ..... | ..... | ..... | 20,000 | 1,000 |
| Steelhead trout | ..... | ..... | ..... | ..... | 5,378 | 276 |
| Total | ..... | ..... | ..... | ..... | 9,323,234 | 461,882 |
| SEINES. | | | | | | |
| Blueback | ..... | ..... | ..... | ..... | 11,700 | 372 |
| Chinook, fresh | ..... | ..... | ..... | ..... | 897,746 | 43,670 |
| Chinook, salted | ..... | ..... | ..... | ..... | 42,049 | 3,332 |
| Silver, fresh | ..... | ..... | ..... | ..... | 12,000 | 360 |
| Silver, salted | ..... | ..... | ..... | ..... | 26,000 | 900 |
| Dog | ..... | ..... | ..... | ..... | 4,200 | 84 |
| Total | ..... | ..... | ..... | ..... | 993,695 | 48,718 |
| LINES. | | | | | | |
| Chinook | 1,769,524 | $72,634 | 37,373 | $1,759 | 1,806,897 | 74,393 |
| Silver | 10,000 | 500 | 4,500 | 225 | 14,500 | 725 |
| Steelhead trout | ..... | ..... | 111 | 7 | 3,611 | 277 |
| Total | 1,779,524 | 73,134 | 41,984 | 1,991 | 1,825,008 | 75,395 |
| TOTAL. | | | | | | |
| Blueback | ..... | ..... | ..... | ..... | 21,000 | 689 |
| Chinook, fresh | 1,769,524 | 72,634 | 37,373 | 1,759 | 11,893,199 | 575,542 |
| Chinook, salted | ..... | ..... | ..... | ..... | 69,049 | 4,552 |
| Silver, fresh | 10,000 | 500 | 4,500 | 225 | 99,500 | 2,675 |
| Silver, salted | ..... | ..... | ..... | ..... | 46,000 | 1,900 |
| Dog | ..... | ..... | ..... | ..... | 4,200 | 84 |
| Steelhead trout | ..... | ..... | 111 | 7 | 8,989 | 553 |
| Grand total | 1,779,524 | 73,134 | 41,984 | 1,991 | 12,141,937 | 585,995 |

## STATISTICS BY WATERS.

*Persons employed.*—Of the 2,675 persons employed in the industry, 1,880 were on the Sacramento River. The next largest number was employed on Monterey Bay.

PERSONS ENGAGED IN THE SALMON FISHERIES OF CALIFORNIA, BY WATERS AND NATIONALITIES, IN 1909.

| Occupation and race. | Smith River. | Klamath River. | Mad River. | Eureka Bay. | Eel River. | Sacramento River. | Monterey Bay. | Total. |
|---|---|---|---|---|---|---|---|---|
| Fishermen: | | | | | | | | |
| Whites | 47 | 37 | 41 | 7 | 291 | 1,558 | 133 | 2,114 |
| Chinese | | | | | | | 15 | 15 |
| Japanese | | | | | | 24 | 144 | 168 |
| Total | 47 | 37 | 41 | 7 | 291 | 1,582 | 292 | 2,297 |
| Shoresmen: | | | | | | | | |
| Whites | 17 | | | 6 | 13 | 214 | 26 | 276 |
| Indians | 15 | | | | | | | 15 |
| Japanese | | | | | | 5 | | 5 |
| Total | 32 | | | 6 | 13 | 219 | 26 | 296 |
| Transporters: | | | | | | | | |
| Whites | | 3 | | | | 79 | | 112 |
| Total: | | | | | | | | |
| Whites | 64 | 40 | 41 | 13 | 304 | 1,851 | 159 | 2,472 |
| Indians | 15 | | | | | | | 15 |
| Chinese | | | | | | | 15 | 15 |
| Japanese | | | | | | 29 | 144 | 173 |
| Grand total | 79 | 40 | 41 | 13 | 304 | 1,880 | 318 | 2,675 |

*Investment, apparatus, etc.*—More than nine-tenths of the total investment is represented in the Sacramento River. Trolling lines are used in Monterey Bay.

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY WATERS, IN 1909.

| Items. | Smith River. | | Klamath River. | | Mad River. | | Eureka Bay. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | | | 1 | $3,248 | | | | |
| Tonnage | | | 9 | | | | | |
| Outfit | | | | 750 | | | | |
| Fishing boats, sail and row | 23 | $770 | 31 | 1,870 | 33 | $865 | 7 | $175 |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | 4 | 550 | | | 4 | 500 | | |
| Gill nets, drift | 15 | 800 | 35 | 10,500 | 37 | 1,800 | 7 | 525 |
| Shore and accessory property | | 420 | | 16,600 | | 100 | | 900 |
| Cash capital | | | | 10,000 | | | | 1,500 |
| Total | | 2,540 | | 42,968 | | 3,265 | | 3,100 |

INVESTMENT IN THE SALMON FISHERIES OF CALIFORNIA, BY WATERS, IN 1909—Continued.

| Items. | Eel River. | | Sacramento River. | | Monterey Bay. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | | | 3 | $34,500 | | | 4 | $37,748 |
| Tonnage | | | 47 | | | | 56 | |
| Outfit | | | | 3,170 | | | | 3,920 |
| Power boats | | | 41 | 63,300 | | | 41 | 63,300 |
| Fishing boats, power | | | 126 | 66,200 | 45 | $24,850 | 171 | 91,050 |
| Fishing boats, sail and row | 213 | $5,585 | 668 | 108,575 | 183 | 10,405 | 1,158 | 128,245 |
| Scows and house boats | 2 | 100 | 48 | 13,825 | | | 50 | 13,925 |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | 13 | 1,950 | 26 | 2,650 | | | 47 | 5,650 |
| Gill nets, drift | 242 | 17,050 | 750 | 136,895 | | | 1,086 | 167,570 |
| Trolling lines | | | | | | 1,149 | | 1,149 |
| Hand lines | | | | 10 | | | | 10 |
| Shore and accessory property | | 6,750 | | 468,623 | | 4,000 | | 497,393 |
| Cash capital | | 3,000 | | 178,500 | | 30,000 | | 223,000 |
| Total | | 34,435 | | 1,076,248 | | 70,404 | | 1,232,960 |

*Catch.*—About four-fifths of the total catch was made on the Sacramento River; Monterey Bay was second and Eel River third. With the exception of Monterey Bay, gill nets take the largest part of the catch on all the waters. The catch of species other than chinook is very small.

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS, SPECIES, AND WATERS, IN 1909.

| Apparatus and species. | Smith River. | | Klamath River. | | Mad River. | | Eureka Bay. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | | | |
| Blueback | | | | | 3,800 | $152 | | |
| Chinook, fresh | 40,000 | $1,200 | 484,225 | $7,332 | 50,000 | 2,000 | 28,000 | $840 |
| Chinook, salted | 20,000 | 800 | 7,000 | 420 | | | | |
| Silver, fresh | | | 50,000 | 900 | 12,000 | 360 | | |
| Silver, salted | | | 20,000 | 1,000 | | | | |
| Total | 60,000 | 2,000 | 561,225 | 9,652 | 65,800 | 2,512 | 28,000 | 840 |
| HAUL SEINES. | | | | | | | | |
| Blueback | | | | | 2,100 | 84 | | |
| Chinook, fresh | | | | | 28,000 | 1,120 | | |
| Chinook, salted | 10,000 | 400 | | | 6,000 | 360 | | |
| Silver, fresh | | | | | 7,000 | 210 | | |
| Silver, salted | 24,000 | 800 | | | | | | |
| Total | 34,000 | 1,200 | | | 43,100 | 1,774 | | |
| TOTAL. | | | | | | | | |
| Blueback | | | | | 5,900 | 236 | | |
| Chinook, fresh | 40,000 | 1,200 | 484,225 | 7,332 | 78,000 | 3,120 | 28,000 | 840 |
| Chinook, salted | 30,000 | 1,200 | 7,000 | 420 | 6,000 | 360 | | |
| Silver, fresh | | | 50,000 | 900 | 19,000 | 570 | | |
| Silver, salted | 24,000 | 800 | 20,000 | 1,000 | | | | |
| Grand total | 94,000 | 3,200 | 561,225 | 9,652 | 108,900 | 4,286 | 28,000 | 840 |

PRODUCTS OF THE SALMON FISHERIES OF CALIFORNIA, BY APPARATUS, SPECIES, AND WATERS, IN 1909—Continued.

| Apparatus and species. | Eel River. | | Sacramento River. | | Monterey Bay. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | | | |
| Blueback | 5,500 | $165 | | | | | 9,300 | $327 |
| Chinook, fresh | 385,649 | 14,130 | 8,200,682 | $431,977 | | | 9,188,556 | 457,479 |
| Chinook, salted | | | | | | | 27,000 | 1,220 |
| Silver, fresh | 11,000 | 330 | | | | | 73,000 | 1,590 |
| Silver, salted | | | | | | | 20,000 | 1,000 |
| Steelhead trout | 4,700 | 235 | 678 | 41 | | | 5,378 | 276 |
| Total | 406,849 | 14,860 | 8,201,360 | 432,018 | | | 9,323,234 | 461,892 |
| HAUL SEINES. | | | | | | | | |
| Blueback | 9,600 | 288 | | | | | 11,700 | 372 |
| Chinook, fresh | 273,600 | 10,944 | 596,146 | 31,606 | | | 897,746 | 43,670 |
| Chinook, salted | 26,049 | 2,572 | | | | | 42,049 | 3,332 |
| Dog, or chum | 4,200 | 84 | | | | | 4,200 | 84 |
| Silver, fresh | 5,000 | 150 | | | | | 12,000 | 360 |
| Silver, salted | 2,000 | 100 | | | | | 26,000 | 900 |
| Total | 320,449 | 14,138 | 596,146 | 31,606 | | | 993,695 | 48,718 |
| LINES. | | | | | | | | |
| Chinook | | | | | 1,806,897 | $74,393 | 1,806,897 | 74,393 |
| Silver | | | | | 14,500 | 725 | 14,500 | 725 |
| Steelhead trout | | | 3,500 | 270 | 111 | 7 | 3,611 | 277 |
| Total | | | 3,500 | 270 | 1,821,508 | 75,125 | 1,825,008 | 75,395 |
| TOTAL. | | | | | | | | |
| Blueback | 15,100 | 453 | | | | | 21,000 | 689 |
| Chinook, fresh | 659,249 | 25,074 | 8,796,828 | 463,583 | 1,806,897 | 74,393 | 11,893,199 | 575,542 |
| Chinook, salted | 26,049 | 2,572 | | | | | 69,049 | 4,552 |
| Dog, or chum | 4,200 | 84 | | | | | 4,200 | 84 |
| Silver, fresh | 16,000 | 480 | | | 14,500 | 725 | 99,500 | 2,675 |
| Silver, salted | 2,000 | 100 | | | | | 46,000 | 1,900 |
| Steelhead trout | 4,700 | 235 | 4,178 | 311 | 111 | 7 | 8,989 | 553 |
| Grand total | 727,298 | 28,998 | 8,801,006 | 463,894 | 1,821,508 | 75,125 | 12,141,937 | 585,995 |

*Products canned.*—But one cannery was operated in 1909, and that at Requa, on the Klamath River. The pack of this cannery was 5,663 cases of 1-pound flat chinooks, which sold for $28,315.

*Miscellaneous secondary products.*—Mild-cured and smoked salmon comprise the secondary products prepared.

PACK OF MISCELLANEOUS SECONDARY PRODUCTS IN CALIFORNIA, BY WATERS, IN 1909.

| Products. | Eel River. | | Sacramento River. | | Monterey Bay. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Mild-cured: | | | | | | | | |
| Chinook | 64,000 | $6,400 | 4,095,162 | $450,019 | 728,800 | $64,049 | 4,887,962 | $520,468 |
| Smoked: | | | | | | | | |
| Chinook | 50,000 | 5,000 | 56,550 | 8,943 | 4,000 | 700 | 110,550 | 14,643 |
| Silver | 3,000 | 300 | 4,660 | 326 | | | 7,660 | 626 |
| Total | 53,000 | 5,300 | 61,210 | 9,269 | 4,000 | 700 | 118,210 | 15,269 |
| Grand total | 117,000 | 11,700 | 4,156,372 | 459,288 | 732,800 | 64,749 | 5,006,172 | 535,737 |

## ALASKA.

The season of 1909 was a very quiet one in Alaska. Owing to the expected quadrennial heavy run of sockeye salmon on Puget Sound, several cannery men who operate there and in Alaska shut down their Alaska plants and devoted all their energies to the Sound, which materially reduced the amount of fishing gear used in Alaska, and as a consequence the total quantity of products produced. In western Alaska the ice hampered operations in the early part of the season, but, with the exception of the Ugashik and Ugaguk Rivers, the runs were fairly good. The weather was very severe on Nushagak Bay and as a result eight fishermen lost their lives there by drowning. In Central Alaska the run of salmon in the neighborhood of Karluk fell off very materially as compared with 1908, but in Chignik the usual good run appeared. In southeast Alaska, except in the lower portion, the run was very good, but the cannery men packed no more of the cheaper grades than they felt could be disposed of at the then unremunerative prices prevailing.

*Persons engaged.*—The total number of persons engaged in the Alaska salmon fisheries was 11,433. Western Alaska leads in the total number, followed by southeast and central Alaska in the order named. A large number of Indians are employed in this industry.

PERSONS ENGAGED IN THE ALASKA SALMON FISHERIES IN 1909.

| Occupation and race. | Southeast Alaska. | Central Alaska. | Western Alaska. | Total. |
|---|---|---|---|---|
| Fishermen: | | | | |
| Whites | 662 | 400 | 1,424 | 2,486 |
| Indians | 982 | 184 | 10 | 1,176 |
| Japanese | 13 | ..... | ..... | 13 |
| Total | 1,657 | 584 | 1,434 | 3,675 |
| Shoresmen: | | | | |
| Whites | 442 | 277 | 1,192 | 1,911 |
| Indians | 815 | 124 | 307 | 1,246 |
| Chinese | 546 | 377 | 1,069 | 1,992 |
| Japanese | 348 | 356 | 1,432 | 2,136 |
| Total | 2,151 | 1,134 | 4,000 | 7,285 |
| Transporters: | | | | |
| Whites | 148 | 108 | 187 | 443 |
| Indians | 13 | 17 | ..... | 30 |
| Total | 161 | 125 | 187 | 473 |
| Total: | | | | |
| Whites | 1,252 | 785 | 2,803 | 4,840 |
| Indians | 1,810 | 325 | 317 | 2,452 |
| Chinese | 546 | 377 | 1,069 | 1,992 |
| Japanese | 361 | 356 | 1,432 | 2,149 |
| Grand total | 3,969 | 1,843 | 5,621 | 11,433 |

*Investments, apparatus, etc.*—The total investment amounted to $13,948,271. Gill nets predominate, while purse and haul seines and stationary traps are important.

INVESTMENT IN THE ALASKA SALMON FISHERIES IN 1909.

| Items. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Number. | Value. | Number. | Value. | Number. | Value. | Number. | Value. |
| Transporting vessels: | | | | | | | | |
| Power vessels | 69 | $263,256 | 25 | $213,019 | 39 | $591,669 | 133 | $1,067,944 |
| Tonnage | 1,173 | | 1,482 | | 3,236 | | 5,891 | |
| Outfit | | 65,814 | | 53,255 | | 147,917 | | 266,986 |
| Sailing vessels | 5 | 158,000 | 9 | 289,000 | 29 | 638,400 | 43 | 1,085,400 |
| Tonnage | 7,434 | | 14,270 | | 38,057 | | 59,761 | |
| Outfit | | 15,800 | | 28,900 | | 63,840 | | 108,540 |
| Power boats | 11 | 11,760 | 4 | 8,400 | 2 | 4,680 | 17 | 24,840 |
| Fishing boats, power | 60 | 30,000 | | | | | 60 | 30,000 |
| Fishing boats, sail and row | 766 | 25,981 | 300 | 21,215 | 755 | 164,475 | 1,821 | 211,671 |
| Scows and house boats | 98 | 38,175 | 79 | 30,930 | 133 | 101,900 | 310 | 171,005 |
| Pile drivers | 13 | 34,405 | 15 | 29,850 | 15 | 26,300 | 43 | 90,555 |
| Apparatus, shore fisheries: | | | | | | | | |
| Haul seines | 45 | 12,451 | 49 | 15,280 | | | [a]94 | 27,731 |
| Purse seines | 98 | 27,188 | | | | | [b]98 | 27,188 |
| Gill nets, drift | 256 | 34,030 | 57 | 11,020 | 896 | 66,706 | [c]1,209 | 111,756 |
| Traps, stationary | 36 | 79,700 | 20 | 29,450 | 17 | 21,644 | 73 | 130,794 |
| Traps, floating | 14 | 19,750 | 1 | 1,500 | | | 15 | 21,250 |
| Lines | | 523 | | | | | | 523 |
| Spears | 20 | 30 | | | | | 20 | 30 |
| Shore and accessory property | | 1,788,962 | | 1,200,716 | | 2,611,641 | | 5,601,259 |
| Cash capital | | 2,223,493 | | 890,531 | | 1,856,775 | | 4,970,799 |
| Total | | 4,829,258 | | 2,823,066 | | 6,295,947 | | 13,948,271 |

[a] Aggregate length of 30,430 yards.
[b] Aggregate length of 35,670 yards.
[c] Aggregate length of 301,480 yards.

*Catch.*—The total catch amounted to 175,934,060 pounds, valued at $1,333,344. Red or sockeye salmon comprise almost two-thirds of the total catch. As compared with 1908, the catch of all species, except king salmon, decreased very materially, due to causes described elsewhere.

CATCH, BY SPECIES AND APPARATUS, IN THE SALMON FISHERIES OF ALASKA IN 1909.

| Apparatus and species. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| SEINES. | | | | | | | | |
| Coho, or silver | 991,062 | $13,214 | 313,548 | $2,090 | | | 1,304,610 | $15,304 |
| Dog, or chum | 3,102,192 | 5,817 | | | | | 3,102,192 | 5,817 |
| Humpback, or pink | 22,288,020 | 55,720 | 510,196 | 957 | | | 22,798,216 | 56,677 |
| King, or spring | 6,446 | 193 | 85,954 | 195 | | | 92,400 | 388 |
| Red, or sockeye | 6,426,325 | 102,821 | 10,194,165 | 81,553 | | | 16,620,490 | 184,374 |
| Total | 32,814,045 | 177,765 | 11,103,863 | 84,795 | | | 43,917,908 | 262,560 |
| TRAPS. | | | | | | | | |
| Coho, or silver | 673,278 | 8,977 | 539,508 | 3,597 | 59,580 | $397 | 1,272,366 | 12,971 |
| Dog, or chum | 2,699,160 | 5,061 | | | 811,648 | 1,015 | 3,510,808 | 6,076 |
| Humpback, or pink | 11,512,760 | 36,289 | 14,960 | 28 | 60 | 1 | 14,530,780 | 36,318 |
| King, or spring | 112,354 | 3,371 | 981,904 | 2,232 | 68,112 | 155 | 1,162,370 | 5,758 |
| Red, or sockeye | 5,362,896 | 71,505 | 10,762,775 | 86,102 | 2,540,055 | 20,320 | 18,665,726 | 177,927 |
| Total | 23,363,448 | 125,203 | 12,299,147 | 91,959 | 3,479,455 | 21,888 | 39,142,050 | 239,050 |

CATCH, BY SPECIES AND APPARATUS, IN THE SALMON FISHERIES OF ALASKA IN 1909—Continued.

| Apparatus and species. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| GILL NETS. | | | | | | | | |
| Coho, or silver | 473,070 | $6,308 | ..... | ..... | 428,358 | $6,010 | 901,428 | $12,318 |
| Dog, or chum | 72,328 | 136 | ..... | ..... | 2,770,720 | 3,554 | 2,843,048 | 3,690 |
| Humpback, or pink | 509,688 | 1,274 | ..... | ..... | 127,244 | 796 | 636,932 | 2,070 |
| King, or spring | 1,510,498 | 45,315 | 397,298 | $902 | 2,835,646 | 10,781 | 4,743,442 | 56,998 |
| Red, or sockeye | 2,391,990 | 38,272 | 2,439,920 | 19,519 | 75,669,360 | 605,355 | 80,501,270 | 663,146 |
| Total | 4,957,574 | 91,305 | 2,837,218 | 20,421 | 81,831,328 | 626,496 | 89,626,120 | 738,222 |
| LINES. | | | | | | | | |
| Coho, or silver | 48,000 | 640 | ..... | ..... | ..... | ..... | 48,000 | 640 |
| King, or spring | 2,961,332 | 88,840 | ..... | ..... | ..... | ..... | 2,961,332 | 88,840 |
| Steelhead trout | 11,650 | 400 | ..... | ..... | ..... | ..... | 11,650 | 400 |
| Total | 3,020,982 | 89,880 | ..... | ..... | ..... | ..... | 3,020,982 | 89,880 |
| SPEARS. | | | | | | | | |
| Red, or sockeye | 227,000 | 3,632 | ..... | ..... | ..... | ..... | 227,000 | 3,632 |
| TOTAL. | | | | | | | | |
| Coho, or silver | 2,185,410 | 29,139 | 853,056 | 5,687 | 487,938 | 6,407 | 3,526,404 | 41,233 |
| Dog, or chum | 5,873,680 | 11,014 | ..... | ..... | 3,582,368 | 4,569 | 9,456,048 | 15,583 |
| Humpback, or pink | 37,313,468 | 93,283 | 525,156 | 985 | 127,304 | 797 | 37,965,928 | 95,065 |
| King, or spring | 4,590,630 | 137,719 | 1,465,156 | 3,329 | 2,903,758 | 10,936 | 8,959,544 | 151,984 |
| Red, or sockeye | 14,408,211 | 216,230 | 23,396,860 | 187,174 | 78,209,415 | 625,675 | 116,014,486 | 1,029,079 |
| Steelhead trout | 11,650 | 400 | ..... | ..... | ..... | ..... | 11,650 | 400 |
| Grand total | 64,383,049 | 487,785 | 26,240,228 | 197,175 | 85,310,783 | 648,384 | 175,934,060 | 1,333,344 |

*Products canned.*—The total canned pack amounted to 2,403,669 pound and half-pound cases, valued at $9,438,152. More than two-thirds of the pack was composed of red salmon. Three canneries were not operated, which very materially reduced the size of the pack.

OUTPUT OF SALMON FROM THE CANNERIES IN ALASKA IN 1909, BY SPECIES AND SIZE OF CANS.[a]

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Coho, or silver: | | | | | | | | |
| 1-pound flat | 1,206 | $5,543 | ..... | ..... | ..... | ..... | 1,206 | $5,543 |
| 1-pound tall | 38,714 | 155,431 | 10,275 | $43,155 | 6,361 | $26,900 | 55,350 | 225,486 |
| Total | 39,920 | 160,974 | 10,275 | 43,155 | 6,361 | 26,900 | 56,556 | 231,029 |
| Dog, or chum: | | | | | | | | |
| 1-pound tall | 83,001 | 186,454 | ..... | ..... | 37,711 | 87,656 | 120,712 | 274,110 |
| Humpback, or pink: | | | | | | | | |
| 1-pound tall | 455,999 | 1,092,389 | 5,581 | 13,394 | 3,293 | 9,056 | 464,873 | 1,114,839 |
| King, or spring: | | | | | | | | |
| 1-pound tall | 857 | 3,598 | 16,913 | 74,418 | 30,264 | 129,608 | 48,034 | 207,624 |
| Red, or sockeye: | | | | | | | | |
| ½-pound flat | 14,898 | 58,535 | ..... | ..... | 1,487 | 5,353 | 16,385 | 63,888 |
| 1-pound flat | 80,200 | 209,962 | 2,936 | 15,539 | 2,057 | 11,108 | 85,193 | 236,609 |
| 1-pound tall | 185,444 | 825,926 | 355,349 | 1,625,371 | 1,071,123 | 4,858,756 | 1,611,916 | 7,310,053 |
| Total | 280,542 | 1,094,423 | 358,285 | 1,640,910 | 1,074,667 | 4,875,217 | 1,713,494 | 7,610,550 |
| Grand total | 860,319 | 2,537,838 | 391,054 | 1,771,877 | 1,152,296 | 5,128,437 | 2,403,669 | 9,438,152 |

[a] All 1-pound cases contain forty-eight 1-pound cans; the ½-pound cases contain forty-eight ½-pound cans. Reduced to a common basis of cases containing forty-eight 1-pound cans the pack is 2,395,477½ cases.

*Miscellaneous products.*—The total miscellaneous products prepared amounted to 9,473,005 pounds, valued at $374,324. Owing to the low prices prevailing for pickled salmon, the pack of such very materially declined. Restrictive regulations in regard to the pickling of salmon bellies also aided in reducing the pack. The mild-cured pack shows a gratifying increase over 1908.

MISCELLANEOUS SECONDARY SALMON PRODUCTS PREPARED IN ALASKA IN 1909.

| Products. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Frozen: | | | | | | | | |
| Coho, or silver | 35,721 | $1,072 | | | | | 35,721 | $1,072 |
| Dog, or chum | 77,882 | 1,558 | | | | | 77,882 | 1,558 |
| Steelhead trout | 9,450 | 473 | | | | | 9,450 | 473 |
| Total | 123,053 | 3,103 | | | | | 123,053 | 3,103 |
| Mild-cured: | | | | | | | | |
| King, or spring | 1,833,600 | 149,300 | | | | | 1,833,600 | 149,300 |
| Pickled: | | | | | | | | |
| Coho, or silver | 40,400 | 1,405 | 17,800 | $810 | 5,400 | $270 | 63,600 | 2,485 |
| Coho bellies | | | 227,750 | 3,843 | | | 227,750 | 3,843 |
| Dog, or chum | 3,000 | 90 | | | 4,000 | 100 | 7,000 | 190 |
| Humpback | 311,400 | 9,405 | | | | | 311,400 | 9,405 |
| Humpback backs | 11,200 | 224 | | | | | 11,200 | 224 |
| Humpback bellies | 123,480 | 6,896 | 46,000 | 500 | | | 169,480 | 7,396 |
| King, or spring | 6,200 | 248 | | | 82,000 | 3,550 | 88,200 | 3,798 |
| King bellies | 7,000 | 175 | | | | | 7,000 | 175 |
| Red, or sockeye | | | 437,800 | 17,319 | 4,863,700 | 149,979 | 5,301,500 | 167,298 |
| Redbellies | | | 783,600 | 13,902 | | | 783,600 | 13,902 |
| Total | 502,680 | 18,443 | 1,512,950 | 36,374 | 4,955,100 | 153,899 | 6,970,730 | 208,716 |
| Dry-salted and dried: | | | | | | | | |
| Coho backs | | | 14,500 | 549 | | | 14,500 | 549 |
| Dog | 71,600 | 1,038 | | | | | 71,600 | 1,038 |
| Humpback backs | 50,000 | 500 | 1,500 | 45 | | | 51,500 | 545 |
| King | 800 | 45 | | | | | 800 | 45 |
| Redbacks | | | 83,000 | 2,302 | | | 83,000 | 2,302 |
| Total | 122,400 | 1,583 | 99,000 | 2,896 | | | 221,400 | 4,479 |
| Smoked: | | | | | | | | |
| Coho backs | | | 4,000 | 400 | | | 4,000 | 400 |
| Dog | 585 | 43 | | | | | 585 | 43 |
| Redbacks | | | 28,300 | 1,580 | 12,000 | 1,200 | 40,300 | 2,780 |
| Total | 585 | 43 | 32,300 | 1,980 | 12,000 | 1,200 | 44,885 | 3,223 |
| Fertilizer | 159,224 | 2,287 | | | | | 159,224 | 2,287 |
| Oil | 120,113 | 3,216 | | | | | [a] 120,113 | 3,216 |
| Grand total | 2,862,202 | 177,975 | 1,644,250 | 41,250 | 4,967,100 | 155,099 | 9,473,005 | 374,324 |

[a] Represents 16,015 gallons.

As the fisheries of Alaska are carried on almost wholly in innumerable bays, straits, and sounds, but little being done in the rivers, it does not seem desirable to show them by waters, owing to the amount of space required for the tables.

## BRITISH COLUMBIA.

The canned salmon pack of British Columbia was the only branch of the salmon industry of the Province which could be shown by species. Owing to the quadrennially heavy run occurring in the Fraser River in 1909, the pack of British Columbia is quite large. The pack is shown by water areas.

PACK OF CANNED SALMON IN BRITISH COLUMBIA, CANADA, IN 1909.

| Species. | Fraser River. | | Skeena River. | | Rivers Inlet. | | Nass River. | |
|---|---|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Coho, or silver: | | | | | | | | |
| ½-pound flat | 710 | $1,988 | 1,158 | $3,242 | 264 | $739 | ..... | ..... |
| 1-pound flat | 5,735 | 27,528 | ..... | ..... | 176 | 845 | ..... | ..... |
| 1-pound tall | 15,459 | 64,928 | 11,671 | 49,034 | 1,092 | 4,586 | 6,818 | $28,636 |
| Total | 21,904 | 94,444 | 12,829 | 52,276 | 1,532 | 6,170 | 6,818 | 28,636 |
| Dogs, or chums: | | | | | | | | |
| 1-pound tall | 725 | 1,740 | 12,000 | 28,800 | ..... | ..... | ..... | ..... |
| Humpback, or pink: | | | | | | | | |
| 1-pound flat | 227 | 624 | 40 | 110 | ..... | ..... | ..... | ..... |
| 1-pound tall | 1,053 | 2,527 | 16,080 | 38,640 | ..... | ..... | 3,589 | 8,614 |
| Total | 1,280 | 3,151 | 16,120 | 38,750 | ..... | ..... | 3,589 | 8,614 |
| King, or spring: | | | | | | | | |
| ½-pound flat | ..... | ..... | ..... | ..... | 304 | 1,216 | 56 | 224 |
| 1-pound flat | 1,167 | 7,032 | ..... | ..... | 47 | 282 | ..... | ..... |
| ½-pound tall | 176 | 516 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1-pound tall | 173 | 934 | 12,025 | 64,935 | 388 | 1,095 | 2,309 | 12,469 |
| 1-pound oval | ..... | ..... | 444 | 2,886 | ..... | ..... | ..... | ..... |
| Total | 1,516 | 8,482 | 12,469 | 67,821 | 739 | 2,593 | 2,365 | 12,693 |
| Sockeye, or red: | | | | | | | | |
| ½-pound flat | 309,634 | 1,238,536 | 72,838 | 291,352 | 51,520 | 206,080 | 11,162 | 44,648 |
| 1-pound flat | 243,697 | 1,462,182 | 19,789 | 118,734 | 28,750 | 172,500 | 2,070 | 12,420 |
| ½-pound tall | ..... | ..... | 2,600 | 8,580 | 10,280 | 33,924 | ..... | ..... |
| 1-pound tall | 126,597 | 683,624 | 30,393 | 164,122 | 29,377 | 158,636 | 20,189 | 109,021 |
| ½-pound oval | 17,650 | 75,013 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1-pound oval | ..... | ..... | ..... | ..... | ..... | ..... | 406 | 2,639 |
| 1-pound squats | 8,312 | 49,872 | ..... | ..... | ..... | ..... | ..... | ..... |
| Total | 705,890 | 3,509,227 | 125,620 | 582,788 | 119,927 | 571,140 | 33,827 | 168,728 |
| Grand total | 731,315 | 3,617,044 | 181,038 | 770,435 | 122,198 | 579,903 | 46,599 | 218,671 |

PACK OF CANNED SALMON IN BRITISH COLUMBIA, CANADA, IN 1909—Continued.

| Species. | Northern miscellaneous waters. | | Vancouver Island. | | Total. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| Coho, or silver: | | | | | | |
| ½-pound flat | | | | | 2,132 | $5,969 |
| 1-pound flat | | | | | 5,911 | 28,373 |
| 1-pound tall | 13,071 | $54,898 | 13,409 | $56,318 | 61,520 | 258,400 |
| Total | 13,071 | 54,898 | 13,409 | 56,318 | 69,563 | 292,742 |
| Dogs, or chums: | | | | | | |
| 1-pound tall | 1,568 | 3,763 | 2,280 | 5,472 | 16,573 | 39,775 |
| Humpback, or pink: | | | | | | |
| 1-pound flat | | | 2,000 | 5,500 | 2,267 | 6,234 |
| 1-pound tall | 3,000 | 7,200 | 4,000 | 9,600 | 27,722 | 66,581 |
| Total | 3,000 | 7,200 | 4,000 | 15,100 | 29,989 | 72,815 |
| King, or spring: | | | | | | |
| ½-pound flat | | | | | 360 | 1,440 |
| 1-pound flat | | | | | 1,214 | 7,314 |
| ½-pound tall | | | | | 176 | 516 |
| 1-pound tall | 2,218 | 11,977 | 500 | 2,700 | 17,613 | 94,110 |
| 1-pound oval | | | | | 444 | 2,886 |
| Total | 2,218 | 11,977 | 500 | 2,700 | 19,807 | 106,266 |
| Sockeye, or red: | | | | | | |
| ½-pound flat | 18,806 | 75,224 | 19,800 | 79,200 | 483,760 | 1,935,040 |
| 1-pound flat | | | 20,400 | 122,400 | 314,706 | 1,888,236 |
| ½-pound tall | | | | | 12,880 | 42,504 |
| 1-pound tall | 29,694 | 160,348 | 41,643 | 224,872 | 277,893 | 1,500,623 |
| ½-pound oval | | | | | 17,650 | 75,013 |
| 1-pound oval | | | | | 406 | 2,639 |
| 1-pound squats | | | | | 8,312 | 49,872 |
| Total | 48,500 | 235,572 | 81,843 | 426,472 | 1,115,607 | 5,493,927 |
| Grand total | 68,357 | 313,410 | 102,032 | 506,062 | [a] 1,251,539 | 6,005,525 |

[a] All pound cases contain forty-eight 1-pound cans; the ½-pound cases contain forty-eight ½-pound cans. Reduced to a common basis of cases containing forty-eight 1-pound cans the pack is 993,060 cases.

## VIII. STATISTICAL DATA FOR OTHER YEARS.

### CANNING INDUSTRY OF PACIFIC COAST FROM 1864 TO 1910.

From the beginning of the canning of salmon on this coast it has been the most important branch of the industry, and the table below shows in condensed form the number of cases packed in each year on the Pacific coast of North America from the beginning of the industry in 1864 to 1910.

As British Columbia is a Province of the Dominion of Canada it does not come strictly within the scope of this report, but in order to show the pack of canned salmon on the North American shores of the Pacific Ocean, which would be incomplete without that of the Province, it has been included also.

PACK OF CANNED SALMON ON THE PACIFIC COAST, BY YEARS AND WATERS.

| Year. | Puget Sound. | Grays Harbor. | Willapa Harbor. | Columbia River. | Coastal streams of Oregon. | Smith River, Cal. |
|---|---|---|---|---|---|---|
| | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.* |
| 1866 | | | | 4,000 | | |
| 1867 | | | | 18,000 | | |
| 1868 | | | | 28,000 | | |
| 1869 | | | | 100,000 | | |
| 1870 | | | | 150,000 | | |
| 1871 | | | | 200,000 | | |
| 1872 | | | | 250,000 | | |
| 1873 | | | | 250,000 | | |
| 1874 | | | | 350,000 | | |
| 1875 | | | | 375,000 | | |
| 1876 | | | | 450,000 | | |
| 1877 | 5,500 | | | 380,000 | 7,804 | |
| 1878 | 238 | 5,420 | | 460,000 | 16,634 | 4,277 |
| 1879 | 1,300 | | | 480,000 | 8,571 | |
| 1880 | 5,100 | | | 530,000 | 7,772 | 7,500 |
| 1881 | 8,500 | | | 550,000 | 12,320 | |
| 1882 | 7,900 | | | 541,300 | 19,186 | |
| 1883 | 1,500 | | | 629,400 | 16,156 | |
| 1884 | 5,500 | | | 620,000 | 12,376 | |
| 1885 | 12,000 | | | 553,800 | 9,310 | |
| 1886 | 17,000 | | | 448,500 | 49,147 | |
| 1887 | 22,000 | | | 356,000 | 73,996 | |
| 1888 | 21,975 | 37,000 | 22,500 | 372,477 | 92,863 | 2,317 |
| 1889 | 11,671 | | | 309,885 | 98,800 | |
| 1890 | 8,000 | | | 435,774 | 47,009 | |
| 1891 | 20,529 | 500 | 8,000 | 398,953 | 24,500 | |
| 1892 | 26,426 | 16,500 | 14,500 | 487,338 | 83,600 | |
| 1893 | 89,774 | 22,000 | 16,195 | 415,876 | 52,778 | 1,500 |
| 1894 | 95,400 | 21,400 | 15,100 | 490,100 | 54,815 | 1,500 |
| 1895 | 179,968 | 11,449 | 22,600 | 634,696 | 77,878 | 2,250 |
| 1896 | 195,664 | 21,274 | 24,941 | 481,697 | 87,360 | |
| 1897 | 494,026 | 13,300 | 29,600 | 552,721 | 60,158 | |
| 1898 | 400,200 | 12,100 | 21,420 | 487,944 | 75,679 | |
| 1899 | 919,611 | 24,240 | 21,314 | 332,774 | 82,041 | |
| 1900 | 469,450 | 30,800 | 26,300 | 358,772 | 12,237 | |
| 1901 | 1,380,590 | 41,500 | 34,000 | 390,183 | 58,618 | |
| 1902 | 581,659 | 31,500 | 39,492 | 317,143 | 44,236 | |
| 1903 | 478,488 | | 5,890 | 339,577 | 54,861 | |
| 1904 | 291,488 | 27,559 | 26,400 | 395,104 | 98,874 | |
| 1905 | 1,018,641 | 22,050 | 14,950 | 397,273 | 89,055 | |
| 1906 | 430,602 | 22,000 | 14,440 | 394,898 | 107,332 | |
| 1907 | 698,080 | 14,000 | 13,382 | 324,171 | 79,712 | |
| 1908 | 448,765 | 14,000 | 20,457 | 253,341 | 52,478 | |
| 1909 | 1,632,949 | 19,787 | 12,024 | 274,087 | 58,169 | |
| 1910 | 567,883 | 51,130 | 14,508 | 391,415 | 103,617 | |
| Total | 10,548,380 | 459,509 | 418,013 | 16,960,199 | 1,829,942 | 19,374 |

PACK OF CANNED SALMON ON THE PACIFIC COAST, BY YEARS AND WATERS—Con

| Year. | Klamath River, Cal. | Eel River, Cal. | Sacramento River. | Alaska. | British Columbia. | Total. |
|---|---|---|---|---|---|---|
| | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.a* |
| 1864 | | | 2,000 | | | 2,000 |
| 1865 | | | 2,000 | | | 2,000 |
| 1866 | | | | | | 4,000 |
| 1867 | | | | | | 18,000 |
| 1868 | | | | | | 28,000 |
| 1869 | | | | | | 100,000 |
| 1870 | | | | | | 150,000 |
| 1871 | | | | | | 200,000 |
| 1872 | | | | | | 250,000 |
| 1873 | | | | | | 250,000 |
| 1874 | | | 2,500 | | | 352,500 |
| 1875 | | | 3,000 | | | 378,000 |
| 1876 | | | 10,000 | | 7,247 | 467,247 |
| 1877 | | 8,500 | 21,500 | | 58,387 | 481,691 |
| 1878 | | 10,500 | 34,017 | 8,159 | 89,946 | 629,191 |
| 1879 | | | 13,855 | 12,530 | 61,093 | 577,349 |
| 1880 | | 6,250 | 62,000 | 6,539 | 61,849 | 687,010 |
| 1881 | | | 181,200 | 8,977 | 169,576 | 930,573 |
| 1882 | | | 200,000 | 24,745 | 240,461 | 1,030,592 |
| 1883 | | | 123,000 | 48,337 | 163,438 | 981,831 |
| 1884 | | | 81,450 | 64,886 | 123,706 | 907,918 |
| 1885 | | | 90,000 | 83,415 | 108,517 | 857,042 |
| 1886 | | | 39,300 | 142,065 | 152,964 | 848,976 |
| 1887 | | | 36,500 | 206,677 | 204,083 | 899,256 |
| 1888 | 4,400 | | 68,075 | 412,115 | 184,040 | 1,217,792 |
| 1889 | | | 57,300 | 719,196 | 417,211 | 1,614,066 |
| 1890 | | | 25,065 | 682,591 | 411,257 | 1,609,696 |
| 1891 | | | 10,353 | 801,400 | 314,511 | 1,578,746 |
| 1892 | | | 2,281 | 474,717 | 248,721 | 1,354,083 |
| 1893 | 1,600 | | 23,336 | 643,654 | 610,202 | 1,876,915 |
| 1894 | 1,700 | | 28,463 | 686,440 | 492,232 | 1,887,150 |
| 1895 | 1,600 | | 25,185 | 626,530 | 587,692 | 2,169,848 |
| 1896 | | | 13,387 | 966,707 | 617,782 | 2,408,812 |
| 1897 | | | 38,543 | 909,078 | 1,027,183 | 3,124,609 |
| 1898 | | | 29,731 | 965,097 | 492,551 | 2,484,722 |
| 1899 | 1,600 | | 32,580 | 1,078,146 | 765,519 | 3,257,825 |
| 1900 | | | 39,304 | 1,548,139 | 606,540 | 3,091,542 |
| 1901 | | | 17,500 | 2,016,804 | 1,247,212 | 5,186,407 |
| 1902 | 2,500 | | 14,043 | 2,536,824 | 627,161 | 4,194,558 |
| 1903 | | | 8,200 | 2,246,210 | 473,847 | 3,607,073 |
| 1904 | 3,400 | | 14,407 | 1,953,756 | 465,894 | 3,276,882 |
| 1905 | | | 2,780 | 1,894,516 | 1,167,822 | 4,607,087 |
| 1906 | | | | 2,219,044 | 629,460 | 3,817,776 |
| 1907 | | | | 2,169,873 | 547,459 | 3,522,506 |
| 1908 | | | | 2,606,973 | 566,303 | 3,962,317 |
| 1909 | 5,633 | | | 2,395,477 | 993,060 | 5,393,670 |
| 1910 | 8,016 | 6,000 | | 2,413,054 | 760,830 | 4,316,453 |
| Total | 30,449 | 31,250 | 1,352,855 | 33,569,671 | 15,695,756 | 80,593,711 |

a Reduced to a common basis of forty-eight 1-pound cans to the case.

## CANNING INDUSTRY, BY SPECIES AND WATERS.

The tables below show separately, by waters and as far as possible by species, the salmon canned on the Pacific coast from the beginning of the industry until 1910. It is only within recent years that the published statistics have shown the pack of the different species separately. In the early years of canning, the chinook, or quinnat, salmon was used exclusively, the other species not being utilized until the chinook had begun to decrease in abundance, or a demand had arisen for a cheaper product. There is a very great difference in the selling value of the highest and lowest grades, and it is necessary to have complete statistical data now in order intelligently to comprehend the trend of the industry. While every effort has been made to make these tables complete, there are, unfortunately, some gaps which it was found impossible to fill.

PACK OF CANNED SALMON ON PUGET SOUND FROM 1877 TO 1910.

| Year. | Number of canneries. | Chinook. | | Blueback. | | Silver. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1877 | 1 | | | | | 5,000 | |
| 1878 | 1 | | | | | 238 | |
| 1879 | 1 | | | | | 1,300 | $5,690 |
| 1880 | 1 | | | | | | |
| 1881 | 1 | | | | | | |
| 1882 | 1 | | | | | | |
| 1883 | 1 | | | | | | |
| 1884 | 1 | | | | | | |
| 1885 | | | | | | | |
| 1886 | | | | | | | |
| 1887 | | | | | | | |
| 1888 | 4 | | | | | | |
| 1889 | 2 | 240 | $1,200 | | | 7,480 | 37,400 |
| 1890 | 1 | 1,000 | 5,000 | | | 3,000 | 15,000 |
| 1891 | 2 | 382 | 2,101 | 5,538 | $24,921 | 5,869 | 19,368 |
| 1892 | 2 | 86 | 473 | 2,954 | 11,816 | 7,206 | 24,500 |
| 1893 | 3 | 1,200 | 6,480 | 47,852 | 103,371 | 11,812 | 59,060 |
| 1894 | 3 | | | 41,781 | 188,014 | 22,418 | 89,672 |
| 1895 | 7 | 1,542 | 7,325 | 65,143 | 273,108 | 50,865 | 154,218 |
| 1896 | 11 | 13,495 | 67,475 | 72,979 | 350,299 | 82,640 | 264,448 |
| 1897 | 12 | 9,500 | 39,045 | 312,048 | 1,248,192 | 91,900 | 282,133 |
| 1898 | 18 | 11,200 | 50,624 | 252,000 | 1,058,400 | 98,600 | 335,240 |
| 1899 | 19 | 24,364 | 103,180 | 499,646 | 2,368,334 | 111,387 | 418,176 |
| 1900 | 19 | 22,350 | 134,100 | 229,800 | 1,149,000 | 128,200 | 512,800 |
| 1901 | | | | | | | |
| 1902 | 21 | 30,049 | 150,245 | 372,301 | 2,047,655 | 85,817 | 429,085 |
| 1903 | 22 | 14,500 | 72,500 | 167,211 | 1,003,200 | 103,450 | 413,800 |
| 1904 | 13 | 14,441 | 69,352 | 109,264 | 653,871 | 118,127 | 447,851 |
| 1905 | 24 | 1,804 | 9,922 | 825,453 | 4,952,718 | 79,335 | 337,174 |
| 1906 | 16 | 8,139 | 48,834 | 178,748 | 1,251,236 | 94,497 | 472,485 |
| 1907 | 14 | 1,814 | 16,326 | 93,122 | 698,416 | 119,472 | 476,288 |
| 1908 | 11 | 95,210 | 666,470 | 170,951 | 1,196,657 | 128,922 | 644,922 |
| 1909 | 24 | 13,019 | 72,604 | 1,097,904 | 6,183,300 | 143,133 | 630,446 |
| 1910 | 15 | 10,064 | 60,324 | 248,014 | 1,673,095 | 162,755 | 895,153 |

PACK OF CANNED SALMON ON PUGET SOUND FROM 1877 TO 1910—Continued.

| Year. | Number of canneries. | Dog. | | Humpback. | | Total. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1877 | 1 | | | 500 | | 5,500 | |
| 1878 | 1 | | | | | 238 | |
| 1879 | 1 | | | | | 1,300 | $5,690 |
| 1880 | 1 | | | | | 5,100 | |
| 1881 | 1 | | | | | 8,500 | |
| 1882 | 1 | | | | | 7,900 | |
| 1883 | 1 | | | | | 1,500 | |
| 1884 | 1 | | | | | 5,500 | |
| 1885 | | | | | | 12,000 | |
| 1886 | | | | | | 17,000 | |
| 1887 | | | | | | 22,000 | |
| 1888 | 4 | | | | | 21,975 | 126,356 |
| 1889 | 2 | 1,145 | $3,435 | 2,809 | $7,584 | 11,674 | 49,619 |
| 1890 | 1 | 4,000 | 12,000 | | | 8,000 | 32,000 |
| 1891 | 2 | 3,093 | 10,825 | 5,647 | 15,246 | 20,529 | 72,461 |
| 1892 | 2 | 16,180 | 56,630 | | | 26,426 | 93,419 |
| 1893 | 3 | 11,380 | 31,295 | 17,530 | 47,331 | 89,774 | 247,537 |
| 1894 | 3 | 22,152 | 60,918 | 9,049 | 24,432 | 95,400 | 363,036 |
| 1895 | 7 | 38,785 | 94,741 | 23,633 | 62,556 | 179,968 | 591,948 |
| 1896 | 11 | 26,550 | 73,013 | | | 195,664 | 755,235 |
| 1897 | 12 | 23,310 | 64,103 | 57,268 | 171,804 | 494,026 | 1,805,277 |
| 1898 | 18 | 38,400 | 105,600 | | | 400,200 | 1,549,864 |
| 1899 | 19 | 31,481 | 86,427 | 252,733 | 734,241 | 919,611 | 3,710,358 |
| 1900 | 19 | 89,100 | 245,025 | | | 469,450 | 1,940,925 |
| 1901 | | | | | | 1,380,590 | |
| 1902 | 21 | 93,492 | 467,460 | | | 581,659 | 3,094,445 |
| 1903 | 22 | 12,001 | 30,002 | 181,326 | 407 984 | 478,488 | 1,927,546 |
| 1904 | 13 | 49,656 | 124,254 | | | 291,488 | 1,295,328 |
| 1905 | 24 | 41,057 | 102,643 | 70,992 | 212,976 | 1,018,641 | 5,615,433 |
| 1906 | 16 | 149,218 | 708,781 | | | 430,602 | 2,481,336 |
| 1907 | 14 | 50,249 | 150,847 | 433,423 | 1,300,269 | 698,080 | 2,642,146 |
| 1908 | 11 | 47,607 | 142,821 | 6,075 | 18,225 | 448,765 | 2,669,095 |
| 1909 | 24 | 53,688 | 128,916 | 370,993 | 902,342 | 1,632,949 | 7,917,608 |
| 1910 | 15 | 146,942 | 514,297 | 108 | 388 | 567,883 | 3,143,256 |

PACK OF CANNED SALMON ON GRAYS HARBOR FROM 1878 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog or chum. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1878 | 1 | | | | | | | 5,420 | $29,268 |
| 1879 | 1 | | | | | | | | |
| 1880 | | | | | | | | | |
| 1881 | | | | | | | | | |
| 1882 | | | | | | | | | |
| 1883 | | | | | | | | | |
| 1884 | | | | | | | | | |
| 1885 | | | | | | | | | |
| 1886 | | | | | | | | | |
| 1887 | | | | | | | | | |
| 1888 | 4 | | | | | | | 37,000 | $212,750 |
| 1889 | | | | | | | | | |
| 1890 | | | | | | | | | |
| 1891 | 1 | | | 500 | $1,500 | | | 500 | 1,500 |
| 1892 | 1 | 4,500 | $15,390 | 9,000 | 30,780 | 3,000 | $9,415 | 16,500 | 55,585 |
| 1893 | 1 | 4,500 | 22,500 | 12,000 | 48,000 | 5,500 | 14,850 | 22,000 | 85,350 |
| 1894 | 1 | 12,300 | 61,500 | 4,100 | 16,400 | 5,000 | 13,500 | 21,400 | 91,400 |
| 1895 | 1 | 56 | 202 | 8,876 | 28,403 | 2,517 | 6,922 | 11,449 | 35,527 |
| 1896 | 2 | 7,816 | 36,806 | 9,278 | 29,689 | 4,180 | 11,495 | 21,274 | 57,990 |
| 1897 | 1 | 3,100 | 11,741 | 8,300 | 23,481 | 1,900 | 5,000 | 13,300 | 40,222 |
| 1898 | 2 | 5,100 | 23,052 | 4,800 | 16,320 | 2,200 | 6,050 | 12,100 | 45,422 |
| 1899 | 1 | 5,000 | 21,250 | 15,740 | 59,025 | 3,500 | 8,750 | 24,240 | 89,025 |
| 1900 | 2 | 6,700 | 33,500 | 12,900 | 51,600 | 11,200 | 30,800 | 30,800 | 115,900 |
| 1901 | | | | | | | | 41,500 | |
| 1902 | 1 | 4,000 | 20,000 | 10,000 | 45,000 | 17,500 | 70,000 | 31,500 | 135,000 |
| 1903 | | | | | | | | | |
| 1904 | 2 | 4,339 | 20,163 | 14,904 | 51,854 | 8,316 | 21,022 | 27,559 | 93,039 |
| 1905 | 2 | 2,050 | 9,225 | 13,000 | 52,000 | 7,000 | 18,200 | 22,050 | 79,425 |
| 1906 | 2 | 2,500 | 10,000 | 11,500 | 43,900 | 8,000 | 21,500 | 22,000 | 75,400 |
| 1907 | 1 | 1,000 | 7,000 | 9,500 | 47,500 | 3,500 | 11,500 | 14,000 | 66,000 |
| 1908 | 1 | 1,000 | 7,000 | 9,500 | 47,500 | 3,500 | 11,500 | 14,000 | 66,000 |
| 1909 | 1 | 5,721 | 20,819 | 9,019 | 38,146 | 5,047 | 11,608 | [a] 19,787 | 70,573 |
| 1910 | 3 | 15,495 | 90,718 | 21,768 | 108,840 | 13,867 | 48,534 | [b] 51,130 | 248,092 |

[a] Also 1,649 cases, valued at $9,051, with sockeyes brought from Puget Sound.
[b] Also 4,350 cases of "Quiniault," or sockeye salmon.

## Pack of Canned Salmon on Willapa Harbor from 1887 to 1910.

| Year. | Number of canneries. | Chinook or Black. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1887 | 4 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1888 | 3 | ..... | ..... | ..... | ..... | ..... | ..... | 22,500 | $129,375 |
| 1889 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1890 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1891 | 1 | ..... | ..... | 8,000 | $24,000 | ..... | ..... | 8,000 | 24,000 |
| 1892 | 1 | 3,000 | $10,260 | 9,000 | 30,780 | 2,500 | $7,745 | 14,500 | 48,785 |
| 1893 | 1 | 1,700 | 9,180 | 7,895 | 31,580 | 6,600 | 18,150 | 16,195 | 58,910 |
| 1894 | 1 | 2,700 | 14,580 | 5,600 | 22,400 | 6,800 | 18,700 | 15,100 | 55,680 |
| 1895 | 2 | 4,636 | 23,180 | 13,047 | 41,150 | 4,917 | 13,222 | 22,600 | 77,552 |
| 1896 | 2 | 4,551 | 22,755 | 11,940 | 38,208 | 8,450 | 21,238 | 24,941 | 82,201 |
| 1897 | 1 | 8,100 | 33,291 | 14,600 | 44,822 | 6,900 | 18,975 | 29,600 | 97,088 |
| 1898 | 2 | 5,865 | 26,510 | 9,809 | 33,351 | 5,746 | 15,802 | 21,420 | 75,663 |
| 1899 | 3 | 5,650 | 25,425 | 10,675 | 40,031 | 4,989 | 13,720 | 21,314 | 79,176 |
| 1900 | 3 | 6,700 | 33,500 | 12,400 | 49,600 | 7,200 | 19,800 | 26,300 | 102,900 |
| 1901 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 34,000 | ..... |
| 1902 | 2 | 5,836 | 29,180 | 9,128 | 41,076 | 24,528 | 97,112 | 39,492 | 167,368 |
| 1903 | 1 | 2,300 | 13,800 | 2,390 | 10,755 | 1,200 | 3,300 | 5,890 | 27,855 |
| 1904 | 2 | 3,000 | 12,000 | 7,400 | 28,440 | 16,000 | 38,700 | 26,400 | 79,140 |
| 1905 | 2 | 4,650 | 20,925 | 4,300 | 17,200 | 6,000 | 15,000 | 14,950 | 53,125 |
| 1906 | 2 | 4,000 | 16,000 | 5,340 | 21,360 | 5,100 | 13,260 | 14,440 | 50,620 |
| 1907 | 2 | 3,530 | 15,354 | 9,228 | 36,682 | 624 | 2,496 | 13,382 | 54,532 |
| 1908 | 2 | 4,017 | 20,585 | 5,923 | 23,692 | 10,517 | 36,809 | 20,457 | 81,086 |
| 1909 | 1 | 1,455 | 5,869 | 4,822 | 17,359 | 5,747 | 13,163 | 12,024 | 36,391 |
| 1910 | 1 | 2,923 | 15,077 | 5,096 | 25,480 | 3,489 | 22,711 | 14,508 | 63,268 |

PACK OF CANNED SALMON ON THE COLUMBIA RIVER FROM THE INCEPTION OF THE INDUSTRY TO 1910.

| Year. | Number of canneries. | Chinook. | | Blueback. | | Silversides. | | Dog or chum. | | Steelhead trout. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1866 | | | | | | | | | | | | 4,000 | $64,000 |
| 1867 | | | | | | | | | | | | 18,000 | 288,000 |
| 1868 | | | | | | | | | | | | 28,000 | 392,000 |
| 1869 | | | | | | | | | | | | 100,000 | 1,350,000 |
| 1870 | | | | | | | | | | | | 150,000 | 1,800,000 |
| 1871 | | | | | | | | | | | | 200,000 | 2,100,000 |
| 1872 | | | | | | | | | | | | 250,000 | 2,325,000 |
| 1873 | | | | | | | | | | | | 250,000 | 2,250,000 |
| 1874 | | | | | | | | | | | | 350,000 | 2,625,000 |
| 1875 | | | | | | | | | | | | 375,000 | 2,250,000 |
| 1876 | | | | | | | | | | | | 450,000 | 2,475,000 |
| 1877 | | | | | | | | | | | | 380,000 | 2,052,000 |
| 1878 | 30 | | | | | | | | | | | 460,000 | 2,300,000 |
| 1879 | 30 | | | | | | | | | | | 480,000 | 2,640,000 |
| 1880 | 29 | | | | | | | | | | | 530,000 | 2,650,000 |
| 1881 | | | | | | | | | | | | 550,000 | 2,475,000 |
| 1882 | | | | | | | | | | | | 541,300 | 2,600,000 |
| 1883 | | | | | | | | | | | | 629,400 | 3,147,000 |
| 1884 | | | | | | | | | | | | 620,000 | 2,915,000 |
| 1885 | | | | | | | | | | | | 553,800 | 2,500,000 |
| 1886 | | | | | | | | | | | | 448,500 | 2,135,000 |
| 1887 | | | | | | | | | | | | 356,000 | 2,124,000 |
| 1888 | 28 | | | | | | | | | | | 372,477 | 2,234,862 |
| 1889 | 21 | 266,697 | $1,600,182 | 17,797 | $101,051 | | | | | 25,391 | $108,587 | 309,885 | 1,809,820 |
| 1890 | 21 | 335,604 | 1,946,087 | 57,345 | 290,069 | | | | | 42,825 | 171,300 | 435,774 | 2,407,456 |
| 1891 | 22 | 353,907 | 2,038,566 | 15,482 | 284,242 | | | | | 29,564 | 118,156 | 398,953 | 2,440,964 |
| 1892 | 24 | 344,267 | 1,996,388 | 66,547 | 372,909 | 4,176 | $20,880 | | | 72,348 | 288,852 | 487,338 | 2,679,069 |
| 1893 | 24 | 288,773 | 1,559,374 | 30,459 | 152,295 | 29,107 | 116,428 | 2,311 | $6,933 | 65,226 | 260,904 | 415,876 | 2,095,934 |
| 1894 | 24 | 351,106 | 1,895,976 | 43,814 | 224,430 | 42,758 | 171,032 | | | 52,422 | 209,688 | 490,100 | 2,501,126 |
| 1895 | 24 | 444,909 | 2,428,658 | 18,015 | 86,523 | 99,091 | 320,683 | 22,493 | 62,591 | 49,678 | 203,542 | 634,696 | 3,110,997 |
| 1896 | 24 | 370,943 | 1,840,511 | 16,983 | 81,518 | 44,108 | 141,145 | | | 49,663 | 198,652 | 481,697 | 2,261,826 |
| 1897 | 22 | 432,753 | 1,804,221 | 12,972 | 51,888 | 60,850 | 197,762 | | | 46,146 | 165,440 | 552,721 | 2,219,311 |
| 1898 | 23 | 329,566 | 1,490,394 | 66,670 | 300,015 | 65,431 | 222,465 | | | 26,277 | 60,352 | 487,944 | 2,073,226 |
| 1899 | 17 | 255,824 | 1,458,175 | 23,969 | 134,723 | 29,638 | 112,655 | 11,379 | 33,836 | 11,994 | 39,486 | 332,774 | 1,777,975 |
| 1900 | 16 | 262,392 | 1,821,258 | 13,162 | 92,184 | 44,925 | 202,163 | 17,696 | 63,706 | 20,597 | 102,985 | 358,772 | 2,282,296 |
| 1901 | | | | | | | | | | | | 390,183 | 1,942,660 |
| 1902 | 14 | 270,580 | 1,428,743 | 17,057 | 86,465 | 10,552 | 44,732 | 10,401 | 41,604 | 8,593 | 42,965 | 317,143 | 1,644,509 |
| 1903 | 16 | 301,762 | 1,610,614 | 8,383 | 42,867 | 12,181 | 49,860 | 10,000 | 37,500 | 7,251 | 36,255 | 339,577 | 1,777,105 |
| 1904 | 20 | 320,378 | 1,944,690 | 12,911 | 78,048 | 31,254 | 118,357 | 20,693 | 52,691 | 9,868 | 48,892 | 395,104 | 2,242,678 |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1905 | 19 | 327,106 | 1,962,636 | 7,768 | 46,608 | 26,826 | 114,011 | 25,751 | 65,206 | 9,822 | $49,110 | 397,273 | 2,237,571 |
| 1906 | 19 | 311,334 | 1,868,007 | 7,816 | 54,712 | 41,446 | 124,338 | 27,802 | 69,505 | 6,500 | 32,500 | 394,898 | 2,149,062 |
| 1907 | 19 | 258,433 | ..... | 5,504 | ..... | 31,757 | ..... | 22,556 | ..... | 5,921 | ..... | 324,171 | 1,763,490 |
| 1908 | 14 | 210,096 | ..... | 8,581 | ..... | 31,432 | ..... | 16,884 | ..... | 10,726 | ..... | 253,341 | 1,380,708 |
| 1909 | 15 | 162,131 | 1,203,546 | [a] 27,908 | 214,561 | 42,178 | 185,070 | 24,542 | 57,115 | 17,382 | 99,796 | [b] 274,087 | 1,760,088 |
| 1910 | 15 | 244,285 | 1,882,137 | 6,234 | 34,287 | 68,922 | 363,688 | 66,538 | 232,883 | 5,436 | 31,203 | 391,415 | 2,544,198 |
| Total | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 16,960,199 | 94,792,931 |

[a] Of these, 2,846 cases, valued at $23,203, were packed with sockeyes brought from Puget Sound.
[b] 55 cases of humpbacks, valued at $132, were also packed with humpbacks brought from Puget Sound.

PACK OF CANNED SALMON ON THE NEHALEM RIVER, OREG., FROM 1887 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1887 | 1 | | | | | | | 5,000 | $30,000 |
| 1888 | | | | | | | | | |
| 1889 | | | | | | | | 6,000 | 32,000 |
| 1890 | | | | | | | | 9,000 | 45,500 |
| 1891 | 1 | | | | | | | 3,500 | 14,000 |
| 1892 | 1 | | | 10,000 | $40,000 | | | 10,000 | 40,000 |
| 1893 | 1 | 1,692 | $6,768 | 5,031 | 20,124 | | | 6,723 | 26,892 |
| 1894 | 1 | 1,627 | 6,508 | 4,866 | 19,464 | | | 6,493 | 25,972 |
| 1895 | 1 | 1,752 | 7,008 | 5,152 | 16,486 | | | 6,904 | 23,494 |
| 1896 | 1 | 2,828 | 8,484 | 5,218 | 15,654 | | | 8,046 | 24,138 |
| 1897 | 2 | 3,384 | 10,152 | 8,306 | 25,098 | | | 11,750 | 35,250 |
| 1898 | 1 | 3,808 | 9,891 | 5,700 | 19,380 | | | 9,508 | 29,271 |
| 1899 | 1 | 1,384 | 5,536 | 7,405 | 26,658 | 1,288 | $3,864 | 10,077 | 36,058 |
| 1900 | 1 | | | | | | | | |
| 1901 | 1 | 268 | 1,139 | 3,273 | 13,092 | 2,669 | 7,206 | 6,210 | 21,437 |
| 1902 | 1 | 271 | 1,431 | 3,169 | 13,468 | 2,570 | 10,280 | 6,010 | 25,179 |
| 1903 | 1 | 686 | 3,670 | 4,615 | 19,614 | | | 5,301 | |
| 1904 | 1 | 500 | 2,500 | 5,000 | 20,000 | 6,000 | 12,000 | 11,500 | 34,500 |
| 1905 | | 2,700 | 16,200 | 2,900 | 12,325 | 6,000 | 15,000 | 11,600 | 43,525 |
| 1906 | 1 | 3,987 | 23,922 | 4,976 | 14,928 | 2,057 | 5,143 | 11,020 | 42,993 |
| 1907 | 1 | 4,000 | | 6,600 | | 2,000 | | 12,600 | |
| 1908 | 1 | 5,000 | | 6,100 | | 2,016 | | | |
| 1909 | 1 | 1,985 | 10,542 | 4,554 | 20,253 | 909 | 2,091 | 7,448 | 32,886 |
| 1910 | 1 | 3,500 | | 5,400 | | 1,500 | | 10,400 | |

PACK OF CANNED SALMON ON TILLAMOOK BAY, OREG., FROM 1886 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1886 | 2 | | | | | | | 37,000 | |
| 1887 | 2 | | | | | | | 21,000 | $115,500 |
| 1888 | 2 | | | | | | | 14,633 | 84,140 |
| 1889 | | | | | | | | 9,500 | 52,250 |
| 1890 | | | | | | | | 14,009 | 79,049 |
| 1891 | 1 | | | | | | | | |
| 1892 | 1 | | | 18,000 | $72,000 | | | 18,000 | 72,000 |
| 1893 | 1 | 497 | $1,988 | 4,000 | 16,000 | 6,919 | $17,297 | 11,416 | 35,285 |
| 1894 | 1 | 700 | 2,800 | 7,763 | 31,052 | 700 | 1,750 | 9,163 | 35,602 |
| 1895 | 1 | | | 6,514 | 20,845 | 7,001 | 19,253 | 13,515 | 40,098 |
| 1896 | 1 | 2,200 | 6,600 | 4,860 | 14,580 | | | 7,060 | 21,180 |
| 1897 | 1 | 2,000 | 6,000 | 9,000 | 27,000 | | | 11,000 | 33,000 |
| 1898 | 1 | 5,000 | 13,000 | 10,342 | 35,162 | | | 15,342 | 48,162 |
| 1899 | 1 | 2,180 | 8,720 | 3,889 | 14,036 | 5,121 | 15,363 | 11,190 | 38,119 |
| 1900 | 1 | | | | | | | | |
| 1901 | 1 | 848 | 4,240 | 2,133 | 9,598 | 3,901 | 10,728 | 6,882 | 24,566 |
| 1902 | 1 | 215 | 1,135 | 2,287 | 9,720 | 4,093 | 16,372 | 6,595 | 27,227 |
| 1903 | 1 | | | 2,727 | 11,590 | 2,620 | 10,480 | 5,347 | 22,070 |
| 1904 | 1 | | | 4,400 | 17,600 | 6,500 | 13,000 | 10,900 | 30,600 |
| 1905 | 1 | 1,100 | 6,600 | 1,700 | 7,650 | 8,800 | 22,000 | 11,600 | 36,250 |
| 1906 | 1 | 1,870 | 11,220 | 2,364 | 7,092 | 1,270 | 3,175 | 5,504 | 21,487 |
| 1907 | 1 | 2,000 | | 3,410 | | 2,314 | | 7,724 | |
| 1908 | 1 | 2,300 | | 6,000 | | 4,000 | | | |
| 1909 | 1 | 2,615 | 15,663 | 5,029 | 21,809 | 3,712 | 8,538 | 11,356 | 46,010 |
| 1910 | 1 | 2,900 | | 4,500 | | 2,000 | | 9,400 | |

PACK OF CANNED SALMON ON NESTUCCA RIVER, OREG., FROM 1887 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1887 | 1 | | | | | | | 4,300 | $23,650 |
| 1888 | 1 | | | | | | | 5,000 | 28,750 |
| 1889 | | | | | | | | 6,700 | 36,850 |
| 1890 | | | | | | | | | |
| 1891 | 1 | | | | | | | | |
| 1892 | | | | | | | | | |
| 1893 | | | | | | | | | |
| 1894 | | | | | | | | | |
| 1895 | | | | | | | | | |
| 1896 | | | | | | | | | |
| 1897 | | | | | | | | | |
| 1898 | | | | | | | | | |
| 1899 | 1 | 1,109 | $4,436 | 3,034 | $10,922 | 513 | $1,539 | 4,656 | 16,897 |
| 1900 | 1 | | | | | | | | |
| 1901 | 1 | 279 | 1,116 | 3,553 | 13,323 | 396 | 1,089 | 4,228 | 15,528 |
| 1902 | | | | | | | | | |
| 1903 | | | | | | | | | |
| 1904 | | | | | | | | | |
| 1905 | 1 | 3,000 | 18,000 | 1,000 | 4,250 | 400 | 1,000 | 4,400 | 23,250 |
| 1906 | 1 | 2,622 | 15,732 | 2,468 | 7,404 | 165 | 413 | 5,255 | 23,549 |
| 1907 | 1 | 2,100 | | 3,540 | | 150 | | 5,790 | |
| 1908 | 1 | 2,000 | | 3,000 | | 100 | | | |
| 1909 | | | | | | | | | |
| 1910 | 1 | 2,000 | | 3,300 | | 140 | | 5,440 | |

PACK OF CANNED SALMON ON SILETZ RIVER, OREG., FROM 1896 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1896 | 1 | 2,500 | $7,500 | 1,900 | $5,700 | | | 4,400 | $13,200 |
| 1897 | 1 | 3,510 | 10,530 | 5,015 | 15,045 | | | 8,525 | 25,575 |
| 1898 | 1 | 3,200 | 8,360 | 4,330 | 14,722 | | | 7,530 | 23,082 |
| 1899 | 1 | 2,200 | 9,900 | 2,319 | 8,696 | 200 | $550 | 4,719 | 19,146 |
| 1900 | 1 | | | | | | | | |
| 1901 | 1 | 876 | 4,380 | 3,740 | 16,830 | 360 | 1,260 | 4,976 | 22,470 |
| 1902 | 1 | 600 | 3,168 | 1,917 | 8,147 | 500 | 2,000 | 3,017 | 13,315 |
| 1903 | | | | | | | | | |
| 1904 | 1 | 1,000 | 5,000 | 3,300 | 13,200 | 1,000 | 2,000 | 5,300 | 20,200 |
| 1905 | 1 | 1,500 | 9,000 | 1,700 | 7,225 | 900 | 2,250 | 4,100 | 18,475 |
| 1906 | 1 | 2,635 | 15,810 | 3,192 | 9,576 | 167 | 418 | 5,994 | 25,804 |
| 1907 | 1 | 2,333 | | 4,300 | | 200 | | 6,833 | |
| 1908 | 1 | 2,100 | | 4,700 | | 300 | | 7,100 | |
| 1909 | | | | | | | | | |
| 1910 | 1 | 2,200 | | 4,600 | | 250 | | 7,050 | |

PACK OF CANNED SALMON ON YAQUINA BAY AND RIVER, OREG., FROM 1887 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1887 | 2 | | | | | | | | |
| 1888 | 3 | | | | | | | 5,088 | $29,256 |
| 1889 | | | | | | | | 5,000 | 27,500 |
| 1890 | | | | | | | | | |
| 1891 | 1 | | | | | | | | |
| 1892 | | | | | | | | | |
| 1893 | | | | | | | | | |
| 1894 | | | | | | | | | |
| 1895 | | | | | | | | | |
| 1896 | 1 | 1,714 | $5,142 | 615 | $1,845 | | | 2,329 | 6,987 |
| 1897 | | | | | | | | | |
| 1898 | 1 | 170 | 442 | 1,530 | 5,202 | | | 1,700 | 5,644 |
| 1899 | 2 | 316 | 1,422 | 3,234 | 12,127 | 1,300 | $3,575 | 4,850 | 17,124 |
| 1900 | 1 | | | | | | | | |
| 1901 | 1 | 96 | 480 | 2,848 | 12,816 | 549 | 1,647 | 3,493 | 14,943 |
| 1902 | | | | | | | | | |
| 1903 | 1 | | | 1,238 | 5,262 | 315 | 787 | 1,553 | 6,049 |
| 1904 | 1 | 50 | 200 | 2,600 | 8,840 | 450 | 1,080 | 3,100 | 10,120 |
| 1905 | 1 | 200 | 1,200 | 2,050 | 8,613 | 62 | 155 | 2,312 | 9,968 |
| 1906 | 1 | 500 | 3,000 | 3,100 | 9,300 | 60 | 150 | 3,660 | 12,450 |
| 1907 | 1 | 834 | | 1,000 | | 49 | | 1,883 | |
| 1908 | 1 | | | 4,000 | | | | 4,000 | |
| 1909 | 1 | | | 1,139 | 4,556 | 33 | 76 | 1,172 | 4,632 |
| 1910 | 1 | | | 2,669 | 13,345 | | | 2,669 | 13,345 |

PACK OF CANNED SALMON ON ALSEA RIVER AND BAY, OREG., FROM 1886 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1886 | 1 | | | | | | | | |
| 1887 | 2 | | | | | | | 11,180 | $64,285 |
| 1888 | 3 | | | | | | | 9,620 | 55,315 |
| 1889 | | | | | | | | 10,000 | 55,000 |
| 1890 | | | | | | | | | |
| 1891 | 1 | | | | | | | | |
| 1892 | 1 | | | 3,600 | $14,400 | | | 3,600 | 14,400 |
| 1893 | 1 | 1,260 | $6,300 | 3,240 | 12,960 | | | 4,500 | 19,260 |
| 1894 | 1 | 440 | 2,200 | 4,160 | 16,640 | | | 4,600 | 18,840 |
| 1895 | 1 | 1,700 | 6,375 | 3,280 | 11,808 | | | 4,980 | 18,183 |
| 1896 | 1 | 3,500 | 10,500 | 3,400 | 10,200 | | | 6,900 | 20,700 |
| 1897 | 1 | 1,800 | 5,400 | 3,200 | 9,600 | | | 5,000 | 15,000 |
| 1898 | 1 | 4,296 | 11,170 | 2,170 | 7,378 | | | 6,466 | 18,548 |
| 1899 | 1 | 2,150 | 9,138 | 5,010 | 19,038 | | | 7,160 | 28,176 |
| 1900 | 1 | | | | | | | | |
| 1901 | 1 | 695 | 3,475 | 4,629 | 18,790 | 891 | $3,118 | 6,215 | 25,383 |
| 1902 | 1 | 701 | 3,702 | 4,530 | 19,253 | 670 | 2,680 | 5,901 | 25,635 |
| 1903 | 1 | 1,031 | 5,516 | 4,242 | 18,029 | 44 | 88 | 5,317 | 23,633 |
| 1904 | 1 | 1,000 | 5,000 | 6,500 | 26,000 | 300 | 600 | 7,800 | 31,600 |
| 1905 | 1 | 2,500 | 15,000 | 1,800 | 7,650 | 700 | 1,750 | 5,000 | 24,400 |
| 1906 | 1 | 3,702 | 22,212 | 3,843 | 11,529 | | | 7,545 | 33,741 |
| 1907 | 1 | 800 | | 5,100 | | 350 | | 6,250 | |
| 1908 | 1 | 1,200 | | 6,000 | | 400 | | 7,600 | |
| 1909 | 1 | 1,119 | 6,714 | 5,486 | 24,027 | 80 | 184 | 6,685 | 30,925 |
| 1910 | 1 | 2,500 | | 5,900 | | 100 | | 8,500 | |

## Pack of Canned Salmon on the Siuslaw River, Oreg., from 1878 to 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1878 | 2 | | | | | | | 10,300 | $55,620 |
| 1879 | 2 | | | | | | | | |
| 1880 | | | | | | | | | |
| 1881 | | | | | | | | | |
| 1882 | | | | | | | | | |
| 1883 | | | | | | | | | |
| 1884 | | | | | | | | | |
| 1885 | | | | | | | | | |
| 1886 | | | | | | | | | |
| 1887 | | | | | | | | | |
| 1888 | 1 | | | | | | | 11,960 | 68,770 |
| 1889 | 1 | | | | | | | 12,000 | 66,000 |
| 1890 | | | | | | | | | |
| 1891 | 2 | | | | | | | | |
| 1892 | 2 | | | 18,000 | $72,000 | | | 18,000 | 72,000 |
| 1893 | 2 | 1,471 | $7,355 | 11,830 | 47,320 | | | 13,301 | 54,675 |
| 1894 | 2 | 1,871 | 9,355 | 14,987 | 59,948 | | | 16,858 | 69,303 |
| 1895 | 2 | 1,637 | 6,139 | 10,465 | 35,274 | | | 12,102 | 41,413 |
| 1896 | 1 | 2,700 | 8,100 | 9,000 | 27,000 | | | 11,700 | 35,100 |
| 1897 | 1 | 1,100 | 3,300 | 3,900 | 11,700 | | | 5,000 | 15,000 |
| 1898 | 1 | 850 | 2,210 | 10,000 | 34,000 | | | 10,850 | 36,210 |
| 1899 | 1 | 1,162 | 4,648 | 7,323 | 26,363 | 115 | $345 | 8,600 | 31,356 |
| 1900 | 2 | | | | | | | | |
| 1901 | 1 | 1,735 | 8,675 | 7,488 | 29,952 | | | 9,223 | 38,627 |
| 1902 | 1 | 1,288 | 6,800 | 4,320 | 18,260 | | | 5,608 | 25,060 |
| 1903 | 1 | 1,519 | 8,127 | 6,842 | 29,079 | | | 8,361 | 37,206 |
| 1904 | 1 | 500 | 2,500 | 6,500 | 26,000 | | | 7,000 | 28,500 |
| 1905 | 1 | | | | | | | | |
| 1906 | 2 | 4,500 | 27,000 | 15,000 | 45,000 | 1,500 | 3,750 | 21,000 | 75,750 |
| 1907 | 1 | | | 15,773 | | | | 15,773 | |
| 1908 | 1 | | | 8,600 | | | | 8,600 | |
| 1909 | 2 | 632 | 3,792 | 7,436 | 32,956 | | | 8,068 | 36,748 |
| 1910 | 2 | 856 | | 12,800 | | 8,502 | | 22,158 | |

## Pack of Canned Salmon on the Umpqua River, Oreg., from 1878 to 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Dog. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1878 | 2 | | | | | | | 8,100 | $43,740 |
| 1879 | 2 | | | | | | | | |
| 1880 | | | | | | | | | |
| 1881 | | | | | | | | | |
| 1882 | | | | | | | | | |
| 1883 | | | | | | | | | |
| 1884 | 2 | | | | | | | | |
| 1885 | 1 | | | | | | | | |
| 1886 | 1 | | | | | | | | |
| 1887 | 1 | | | | | | | 4,000 | 22,000 |
| 1888 | 1 | | | | | | | 9,000 | 51,750 |
| 1889 | 1 | | | | | | | 12,000 | 66,000 |
| 1890 | | | | | | | | | |
| 1891 | 1 | | | | | | | | |
| 1892 | 1 | | | 10,000 | $40,000 | | | 10,000 | 40,000 |
| 1893 | 1 | 809 | $4,045 | 3,204 | 12,816 | | | 4,013 | 16,861 |
| 1894 | 1 | 235 | 1,175 | 6,875 | 27,500 | | | 7,110 | 28,675 |
| 1895 | 1 | 992 | 3,720 | 7,697 | 28,863 | | | 8,689 | 32,583 |
| 1896 | 1 | 1,300 | 3,900 | 8,000 | 24,000 | | | 9,300 | 27,900 |
| 1897 | | | | | | | | | |
| 1898 | | | | | | | | | |
| 1899 | 2 | 925 | 3,860 | 7,576 | 27,006 | 115 | $345 | 8,616 | 31,211 |
| 1900 | 2 | | | | | | | | |
| 1901 | | | | | | | | | |
| 1902 | | | | | | | | | |
| 1903 | 1 | 23 | 123 | 6,733 | 28,615 | | | 6,756 | 28,738 |
| 1904 | 1 | 500 | 2,500 | 9,500 | 38,000 | 500 | 1,000 | 10,500 | 41,500 |
| 1905 | 1 | 6,100 | 36,600 | 10,500 | 44,625 | | | 16,600 | 81,225 |
| 1906 | 1 | 1,143 | 6,858 | 5,613 | 16,839 | | | 6,756 | 23,697 |
| 1907 | | | | | | | | | |
| 1908 | | | | | | | | | |
| 1909 | 1 | 500 | 3,000 | 7,753 | 31,012 | | | 8,253 | 34,012 |
| 1910 | 1 | 2,000 | | 11,000 | | | | 13,000 | |

PACK OF CANNED SALMON ON COOS BAY AND RIVER, OREG., FROM 1887 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Total. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1887 | 2 | ..... | ..... | ..... | ..... | 11,300 | $62,150 |
| 1888 | 1 | ..... | ..... | ..... | ..... | 5,500 | 31,625 |
| 1889 | 1 | ..... | ..... | ..... | ..... | 7,000 | 38,500 |
| 1890 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1891 | 2 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1892 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1893 | 1 | ..... | ..... | 3,125 | $12,500 | 3,125 | 12,500 |
| 1894 | 1 | 163 | $815 | 8,428 | 33,712 | 8,591 | 34,527 |
| 1895 | 1 | 5,110 | 19,163 | 2,332 | 8,934 | 7,442 | 28,097 |
| 1896 | 1 | 13,000 | 39,000 | 2,000 | 6,000 | 15,000 | 45,000 |
| 1897 | 1 | 6,200 | 18,600 | 2,200 | 6,600 | 8,400 | 25,200 |
| 1898 | 2 | 3,142 | 8,169 | 7,180 | 24,412 | 10,322 | 32,581 |
| 1899 | 2 | 1,273 | 5,092 | 5,174 | 18,626 | 6,447 | 23,718 |
| 1900 | 2 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1901 | 1 | 1,215 | 6,075 | 4,082 | 16,328 | 5,297 | 22,403 |
| 1902 | 1 | 412 | 2,175 | 2,640 | 11,220 | 3,052 | 13,395 |
| 1903 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1904 | 1 | 2,033 | 7,725 | 7,200 | 24,480 | 9,233 | 32,205 |
| 1905 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1906 | 1 | 2,043 | 12,258 | 1,755 | 5,265 | 3,798 | 17,523 |
| 1907 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1908 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1909 | 1 | 275 | 1,475 | 3,959 | 17,927 | 4,234 | 19,402 |
| 1910 | 1 | 500 | ..... | 5,500 | ..... | 6,000 | ..... |

PACK OF CANNED SALMON ON THE COQUILLE RIVER, OREG., FROM 1883 TO 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Total. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1883 | 1 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1884 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1885 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1886 | 2 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1887 | 3 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1888 | 2 | ..... | ..... | ..... | ..... | 11,000 | $63,250 |
| 1889 | ..... | ..... | ..... | ..... | ..... | 8,600 | 47,300 |
| 1890 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1891 | 1 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1892 | 1 | ..... | ..... | 5,000 | $20,000 | 5,000 | 20,000 |
| 1893 | 1 | ..... | ..... | 6,500 | 26,000 | 6,500 | 26,000 |
| 1894 | [a] 1 | ..... | ..... | 2,000 | 8,000 | 2,000 | 8,000 |
| 1895 | 2 | 760 | $2,887 | 8,724 | 32,615 | 9,484 | 35,502 |
| 1896 | 2 | 1,225 | 3,675 | 7,800 | 23,400 | 9,025 | 27,075 |
| 1897 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1898 | 2 | 541 | 1,407 | 7,485 | 25,499 | 8,026 | 26,906 |
| 1899 | 2 | 950 | 3,800 | 7,550 | 28,500 | 8,500 | 32,300 |
| 1900 | 1 | 2,636 | 13,180 | 9,601 | 38,404 | 12,237 | 51,584 |
| 1901 | 1 | 133 | 665 | 5,096 | 20,384 | 5,229 | 21,049 |
| 1902 | 1 | 286 | 1,510 | 5,877 | 24,927 | 6,163 | 26,437 |
| 1903 | 1 | 331 | 1,771 | 8,685 | 36,911 | 9,016 | 38,682 |
| 1904 | 2 | 600 | 2,400 | 13,686 | 54,744 | 14,286 | 57,144 |
| 1905 | 2 | 2,100 | 12,600 | 11,343 | 48,208 | 13,443 | 60,808 |
| 1906 | 2 | 821 | 4,926 | 17,979 | 53,937 | 18,800 | 58,863 |
| 1907 | 2 | 306 | ..... | 13,220 | ..... | 13,526 | ..... |
| 1908 | 2 | ..... | ..... | 19,174 | ..... | 19,174 | ..... |
| 1909 | 2 | 250 | 1,255 | 9,818 | 42,687 | 10,068 | 43,942 |
| 1910 | 2 | 420 | ..... | 16,637 | ..... | 17,057 | ..... |

[a] Burned.

## Pack of Canned Salmon on Rogue River, Oreg., from 1877 to 1910.

| Year. | Number of canneries. | Chinook. | | Silver. | | Total. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1877 | 1 | | | | | 7,804 | |
| 1878 | 1 | | | | | 8,534 | |
| 1879 | 1 | | | | | 8,571 | |
| 1880 | 1 | | | | | 7,772 | |
| 1881 | 1 | | | | | 12,320 | |
| 1882 | 1 | | | | | 19,186 | |
| 1883 | 1 | | | | | 16,156 | |
| 1884 | 1 | | | | | 12,376 | |
| 1885 | 1 | | | | | 9,310 | |
| 1886 | 1 | | | | | 12,147 | |
| 1887 | 1 | | | | | 17,216 | |
| 1888 | 1 | | | | | 21,062 | $121,107 |
| 1889 | 1 | | | | | 22,000 | 132,000 |
| 1890 | 1 | | | | | 24,000 | 120,000 |
| 1891 | 1 | | | | | 21,000 | 105,000 |
| 1892 | 1 | 10,000 | $59,000 | 9,000 | $36,000 | 19,000 | 95,000 |
| 1893 | [a] 1 | 3,200 | 16,000 | | | 3,200 | 16,000 |
| 1894 | [b] | | | | | | |
| 1895 | 1 | 10,377 | 41,508 | 4,385 | 15,347 | 14,762 | 56,855 |
| 1896 | 1 | 15,000 | 75,000 | 3,000 | 9,000 | 18,000 | 84,000 |
| 1897 | 1 | 15,355 | 61,420 | 3,653 | 10,959 | 19,008 | 72,379 |
| 1898 | 1 | 12,964 | 51,550 | 501 | 1,303 | 13,465 | 52,853 |
| 1899 | 1 | 5,481 | 30,145 | 1,745 | 6,980 | 7,226 | 37,125 |
| 1900 | 1 | | | | | | |
| 1901 | 1 | 2,681 | 13,405 | 4,184 | 17,736 | 6,865 | 31,141 |
| 1902 | 1 | 3,799 | 20,058 | 4,091 | 17,387 | 7,890 | 37,445 |
| 1903 | 1 | 8,418 | 45,036 | 4,792 | 20,366 | 13,210 | 65,402 |
| 1904 | 1 | 16,000 | 64,000 | 3,255 | 11,392 | 19,255 | 75,392 |
| 1905 | 1 | 18,500 | 111,000 | 1,500 | 6,375 | 20,000 | 117,375 |
| 1906 | 1 | 12,000 | 72,000 | 6,000 | 18,000 | 18,000 | 90,000 |
| 1907 | 1 | 7,537 | | 1,796 | | 9,333 | |
| 1908 | 1 | 4,354 | | 2,650 | | 6,004 | |
| 1909 | 1 | 186 | 1,300 | 699 | 2,977 | 885 | 4,277 |
| 1910 | 1 | 232 | | 2,711 | | 1,943 | |

[a] Burned down during season. [b] Not operated.

## Pack of Canned Salmon on Smith River, Cal., in Specified Years.

| Years. | Number of canneries. | Chinook salmon. | | Silver salmon. | | Total. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1878 | 1 | 4,277 | $23,096 | | | 4,277 | $23,096 |
| 1880 | 1 | 7,500 | | | | 7,500 | |
| 1888 | 1 | 2,347 | 14,082 | | | 2,347 | 14,082 |
| 1893 | 1 | 1,500 | | 500 | | 2,000 | |
| 1894 | 1 | 1,500 | | 500 | | 2,000 | |
| 1895 | 1 | 2,250 | 9,990 | | | 2,250 | 9,990 |

## Pack of Canned Salmon on Klamath River, Cal., in Specified Years.

| Year. | Number of canneries. | Chinook. | | Silver. | | Total. | |
|---|---|---|---|---|---|---|---|
| | | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1888 | 1 | 4,400 | $26,400 | | | 4,400 | $26,400 |
| 1893 | 1 | 1,600 | | | | 1,600 | |
| 1894 | 1 | 1,700 | | | | 1,700 | |
| 1895 | 1 | 1,200 | 5,321 | 400 | $1,500 | 1,600 | 6,821 |
| 1899 | 1 | 1,600 | 8,800 | | | 1,600 | 8,800 |
| 1902 | 1 | 2,500 | | | | 2,500 | |
| 1904 | 1 | 3,400 | 18,360 | | | 3,400 | 18,360 |
| 1909 | 1 | 5,633 | 28,315 | | | 5,633 | 28,315 |
| 1910 | 1 | 8,016 | | | | 8,016 | |

PACK OF CANNED SALMON ON EEL RIVER, CAL., IN SPECIFIED YEARS.

| Year. | Number of canneries. | Chinooks. | |
|---|---|---|---|
| | | Cases. | Value. |
| 1877 | 1 | 8,500 | $51,000 |
| 1878 | 1 | 10,500 | 56,700 |
| 1880 | 1 | 6,250 | ..... |
| 1910 | 1 | 6,000 | ..... |

PACK OF CANNED SALMON ON THE SACRAMENTO RIVER, FROM 1864 TO 1905.

| Year. | Number of canneries. | Cases packed.[a] | Value. | Year. | Number of canneries. | Cases packed.[a] | Value. |
|---|---|---|---|---|---|---|---|
| 1864 | 1 | 2,000 | ..... | 1886 | ..... | 39,300 | ..... |
| 1865 | 1 | 2,000 | ..... | 1887 | ..... | 36,500 | ..... |
| 1866 | ..... | ..... | ..... | 1888 | 6 | 68,075 | $423,750 |
| 1867 | ..... | ..... | ..... | 1889 | 3 | 57,300 | ..... |
| 1868 | ..... | ..... | ..... | 1890 | ..... | 25,065 | ..... |
| 1869 | ..... | ..... | ..... | 1891 | ..... | 10,353 | ..... |
| 1870 | ..... | ..... | ..... | 1892 | ..... | 2,281 | ..... |
| 1871 | ..... | ..... | ..... | 1893 | ..... | 23,336 | ..... |
| 1872 | ..... | ..... | ..... | 1894 | ..... | 28,463 | ..... |
| 1873 | ..... | ..... | ..... | 1895 | 3 | 25,185 | 111,821 |
| 1874 | ..... | 2,500 | ..... | 1896 | ..... | 13,387 | ..... |
| 1875 | ..... | 3,000 | ..... | 1897 | ..... | 38,543 | ..... |
| 1876 | 2 | 10,000 | ..... | 1898 | ..... | 29,731 | ..... |
| 1877 | ..... | 21,500 | ..... | 1899 | ..... | 32,580 | 150,688 |
| 1878 | 6 | 34,017 | $183,692 | 1900 | ..... | 39,304 | ..... |
| 1879 | 4 | 13,855 | 59,577 | 1901 | ..... | 17,500 | ..... |
| 1880 | 9 | 62,000 | ..... | 1902 | ..... | 14,043 | ..... |
| 1881 | ..... | 181,200 | ..... | 1903 | ..... | 8,200 | ..... |
| 1882 | 19 | 200,000 | ..... | 1904 | 2 | 14,407 | 66,936 |
| 1883 | 21 | 123,000 | ..... | 1905 | 1 | 2,780 | ..... |
| 1884 | ..... | 81,450 | ..... | | | | |
| 1885 | 6 | 90,000 | ..... | Total | ..... | 1,352,855 | ..... |

[a] All were quinnat or chinook salmon.

PACK OF CANNED SALMON IN ALASKA, BY DISTRICTS, FROM THE INCEPTION OF THE INDUSTRY.

| Year. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Canneries. | Pack. | Canneries. | Pack. | Canneries. | Pack. | Canneries. | Pack. |
| | | *Cases.* | | *Cases.* | | *Cases.* | | *Cases.* |
| 1878 | 2 | 8,159 | ..... | ..... | ..... | ..... | 2 | 8,159 |
| 1879 | 2 | 12,530 | ..... | ..... | ..... | ..... | 2 | 12,530 |
| 1880 | 1 | 6,539 | ..... | ..... | ..... | ..... | 1 | 6,539 |
| 1881 | 1 | 8,977 | ..... | ..... | ..... | ..... | 1 | 8,977 |
| 1882 | 1 | 11,501 | 2 | 10,244 | ..... | ..... | 3 | 21,745 |
| 1883 | 4 | 20,040 | 2 | 28,297 | ..... | ..... | 6 | 48,337 |
| 1884 | 4 | 22,189 | 2 | 42,297 | 1 | [a] 400 | 7 | 64,886 |
| 1885 | 3 | 16,728 | 2 | 52,687 | 1 | 14,000 | 6 | 83,415 |
| 1886 | 4 | 18,660 | 2 | 74,583 | 3 | 48,822 | 9 | 142,065 |
| 1887 | 5 | 31,462 | 2 | 102,515 | 3 | 72,700 | 10 | 206,677 |
| 1888 | 6 | 81,128 | 6 | 241,101 | 4 | 89,886 | 16 | 412,115 |
| 1889 | 12 | 141,760 | 21 | 461,451 | 4 | 115,985 | 37 | 719,196 |
| 1890 | 12 | 142,901 | 19 | 421,300 | 4 | 118,390 | 35 | 682,591 |
| 1891 | 11 | 156,615 | 14 | 511,367 | 5 | 133,418 | 30 | 801,400 |
| 1892 | 7 | 115,722 | 6 | 295,496 | 2 | 63,499 | 15 | 474,717 |
| 1893 | 8 | 136,053 | 11 | 399,815 | 3 | 107,786 | 22 | 643,654 |
| 1894 | 7 | 142,544 | 10 | 435,052 | 4 | 108,844 | 21 | 686,440 |
| 1895 | 7 | 148,476 | 10 | 327,919 | 6 | 150,135 | 23 | 626,530 |
| 1896 | 9 | 262,381 | 12 | 485,990 | 8 | 218,336 | 29 | 966,707 |
| 1897 | 9 | 271,867 | 13 | 382,899 | 7 | 254,312 | 29 | 909,078 |
| 1898 | 9 | 251,385 | 14 | 395,009 | 7 | 318,703 | 30 | 965,097 |
| 1899 | 9 | 310,219 | 14 | 356,095 | 9 | 411,832 | 32 | 1,078,146 |
| 1900 | 16 | 456,639 | 14 | 492,223 | 12 | 599,277 | 42 | 1,548,139 |

[a] Experimental pack.

PACK OF CANNED SALMON IN ALASKA, BY DISTRICTS, FROM THE INCEPTION OF THE INDUSTRY—Continued.

| Year. | Southeast Alaska. | | Central Alaska. | | Western Alaska. | | Total. | |
|---|---|---|---|---|---|---|---|---|
| | Canneries. | Pack. | Canneries. | Pack. | Canneries. | Pack | Canneries. | Pack. |
| | | *Cases.* | | *Cases.* | | *Cases.* | | *Cases.* |
| 1901 | 21 | 735,449 | 13 | 562,142 | 21 | 719,213 | 55 | 2,016,804 |
| 1902 | 26 | 906,676 | 12 | 583,690 | 26 | 1,046,458 | 64 | 2,536,824 |
| 1903 | 21 | 642,305 | 12 | 417,175 | 27 | 1,186,730 | 60 | 2,246,210 |
| 1904 | 12 | 569,003 | 11 | 499,485 | 32 | 885,268 | 55 | 1,953,756 |
| 1905 | 13 | 433,607 | 9 | 371,755 | 25 | 1,089,154 | 47 | 1,894,516 |
| 1906 | 20 | 767,285 | 8 | 473,024 | 19 | 978,735 | 47 | 2,219,044 |
| 1907 | 22 | 887,503 | 8 | 522,836 | 18 | 759,534 | 48 | 2,169,873 |
| 1908 | 23 | 1,011,648 | 8 | 425,721 | 19 | 1,169,604 | 50 | 2,606,973 |
| 1909 | 19 | 852,870 | 8 | 391,054 | 18 | 1,151,553 | 45 | 2,395,477 |
| 1910 | 23 | 1,066,399 | 10 | 432,517 | 19 | 914,138 | 52 | 2,413,054 |
| Total | | 10,647,220 | | 10,195,739 | | 12,726,712 | | 33,569,671 |

PACK OF CANNED SALMON IN ALASKA FROM 1898 TO 1910, BY SPECIES.

| Year. | Coho, or silver. | | Dog, or chum. | | Humpback, or pink. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1898 | 54,711 | | 5,184 | | 109,399 | |
| 1899 | 39,402 | | 1,931 | | 149,159 | |
| 1900 | 50,984 | | 30,012 | | 232,022 | |
| 1901 | 65,509 | | 47,464 | | 541,427 | |
| 1902 | 82,723 | | 159,849 | | 549,602 | |
| 1903 | 120,506 | | 35,052 | | 355,799 | |
| 1904 | 85,741 | | 21,178 | | 299,333 | |
| 1905 | 67,394 | $215,875 | 41,972 | $113,056 | 168,597 | $498,194 |
| 1906 | 109,141 | 382,109 | 254,812 | 730,235 | 348,297 | 1,046,951 |
| 1907 | 85,190 | 337,384 | 184,173 | 547,757 | 561,973 | 1,799,280 |
| 1908 | 68,827 | 274,089 | 218,513 | 554,197 | 644,133 | 1,733,379 |
| 1909 | 56,556 | 231,029 | 120,712 | 274,110 | 464,873 | 1,114,839 |
| 1910 | 114,026 | 559,666 | 254,218 | 773,409 | 554,322 | 1,764,055 |

| Year. | King, or spring. | | Red, or sockeye. | | Total. | |
|---|---|---|---|---|---|---|
| | Cases. | Value. | Cases. | Value. | Cases. | Value. |
| 1898 | 12,862 | | 782,941 | | 965,097 | |
| 1899 | 23,400 | | 864,254 | | 1,078,146 | |
| 1900 | 37,715 | | 1,197,406 | | 1,548,139 | |
| 1901 | 43,069 | | 1,319,335 | | 2,016,804 | |
| 1902 | 59,104 | | 1,685,546 | | 2,536,824 | |
| 1903 | 47,609 | | 1,687,244 | | 2,246,210 | |
| 1904 | 41,956 | | 1,505,548 | | 1,953,756 | |
| 1905 | 42,125 | $141,999 | 1,574,428 | $5,335,547 | 1,894,516 | $6,304,671 |
| 1906 | 30,834 | 116,222 | 1,475,961 | 5,620,875 | 2,219,044 | 7,896,392 |
| 1907 | 43,424 | 181,718 | 1,295,113 | 5,915,227 | 2,169,873 | 8,781,366 |
| 1908 | 23,730 | 99,867 | 1,651,770 | 7,524,251 | 2,606,973 | 10,185,783 |
| 1909 | 48,034 | 207,624 | 1,705,302 | 7,610,550 | 2,395,477 | 9,438,152 |
| 1910 | 40,221 | 214,802 | 1,450,267 | 7,774,390 | 2,413,054 | 11,086,322 |

PACK OF CANNED SALMON IN BRITISH COLUMBIA SINCE THE INCEPTION OF THE INDUSTRY, BY WATERS.

| Year. | Number of canneries. | Fraser River. | Skeena River. | Rivers inlet. | Nass River. | Vancouver Island. | Northern miscellaneous waters. | Total. |
|---|---|---|---|---|---|---|---|---|
| | | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.* | *Cases.* |
| 1876 | 2 | 7,247 | | | | | | 7,247 |
| 1877 | 5 | 55,387 | 3,000 | | | | | 58,387 |
| 1878 | 8 | 81,446 | 8,500 | | | | | 89,946 |
| 1879 | 9 | 50,490 | 10,603 | | | | | 61,093 |
| 1880 | 9 | 42,155 | 19,694 | | | | | 61,849 |
| 1881 | 11 | 142,516 | 21,560 | | | 5,500 | | 169,576 |
| 1882 | 16 | 199,204 | 24,522 | 5,635 | 6,500 | 4,600 | | 240,461 |
| 1883 | 20 | 105,701 | 31,157 | 10,780 | 9,400 | 6,400 | | 163,438 |
| 1884 | 14 | 34,037 | 53,786 | 20,383 | 8,500 | 7,000 | | 123,706 |
| 1885 | 9 | 89,617 | 12,900 | | | 6,000 | | 108,517 |
| 1886 | 16 | 99,177 | 37,587 | 15,000 | | 1,200 | | 152,964 |
| 1887 | 20 | 130,088 | 58,592 | 11,203 | | 4,200 | | 204,083 |
| 1888 | 21 | 76,616 | 70,106 | 20,000 | 12,318 | 5,000 | | 184,040 |
| 1889 | 28 | 310,122 | 58,405 | 21,722 | 19,800 | 7,162 | | 417,211 |
| 1890 | 33 | 244,352 | 91,645 | 33,500 | 24,700 | 11,060 | 6,000 | 411,257 |
| 1891 | 38 | 177,989 | 77,057 | 36,500 | 11,058 | 3,850 | 8,057 | 314,511 |
| 1892 | 36 | 98,491 | 90,750 | 14,955 | 26,100 | 4,300 | 14,125 | 248,721 |
| 1893 | 44 | 474,237 | 59,021 | 35,416 | 15,680 | 8,098 | 17,750 | 610,202 |
| 1894 | 42 | 363,566 | 61,005 | 40,161 | 20,000 | | 7,500 | 492,232 |
| 1895 | 49 | 432,920 | 69,356 | 58,575 | 20,541 | 3,300 | 3,000 | 587,692 |
| 1896 | 56 | 375,344 | 97,863 | 107,473 | 14,649 | 7,903 | 14,550 | 617,782 |
| 1897 | 65 | 879,776 | 61,310 | 40,090 | 20,000 | 13,807 | 12,200 | 1,027,183 |
| 1898 | 67 | 264,225 | 80,102 | 105,362 | 20,000 | 12,539 | 10,323 | 492,551 |
| 1899 | 68 | 527,396 | 112,562 | 76,428 | 19,442 | 12,150 | 17,541 | 765,519 |
| 1900 | 69 | 331,371 | 135,424 | 74,196 | 20,200 | 17,102 | 28,247 | 606,540 |
| 1901 | 78 | 998,913 | 125,845 | 66,794 | 15,004 | 11,005 | 29,651 | 1,247,212 |
| 1902 | 69 | 327,197 | 155,936 | 70,298 | 23,212 | 16,432 | 34,086 | 627,161 |
| 1903 | 61 | 237,162 | 98,688 | 69,389 | 18,094 | 12,360 | 38,154 | 473,847 |
| 1904 | 51 | 128,903 | 154,869 | 94,292 | 29,587 | 14,888 | 43,355 | 465,894 |
| 1905 | 64 | 846,998 | 114,085 | 83,122 | 32,725 | 50,975 | 39,917 | 1,167,822 |
| 1906 | 59 | 226,744 | 162,420 | 122,878 | 32,534 | 40,511 | 44,343 | 629,460 |
| 1907 | 42 | 163,116 | 159,255 | 94,064 | 31,832 | 76,616 | 22,576 | 547,459 |
| 1908 | 50 | 89,184 | 209,177 | 75,090 | 46,908 | 83,918 | 62,026 | 566,303 |
| 1909 | ..... | 567,230 | 142,740 | 91,014 | 40,990 | 58,954 | 92,132 | 993,060 |
| 1910 | ..... | 223,148 | 222,035 | 129,398 | 39,720 | 53,964 | 92,565 | 760,830 |
| Total | ..... | 9,402,095 | 2,891,557 | 1,623,718 | 579,494 | 560,794 | 638,098 | 15,695,756 |

## PICKLING INDUSTRY.

The salmon-pickling industry was so overshadowed by its giant brother, the canning industry, that statistical data, except for Alaska, were found in extremely fragmentary shape, and only that portion is shown relating to Alaska from the time of annexation to 1909.

PACK OF SALTED SALMON IN ALASKA, 1868 TO 1909.

| Year. | Salmon. | | Salmon bellies. | | Dry-salted salmon. | |
|---|---|---|---|---|---|---|
| | Barrels. | Value. | Barrels. | Value. | Pounds. | Value. |
| 1868 | 2,000 | $16,000 | | | | |
| 1869 | 1,700 | 13,600 | | | | |
| 1870 | 1,800 | 14,400 | | | | |
| 1871 | 700 | 6,300 | | | | |
| 1872 | 1,000 | 9,000 | | | | |
| 1873 | 900 | 7,200 | | | | |
| 1874 | 1,400 | 11,200 | | | | |
| 1875 | 1,200 | 9,600 | | | | |
| 1876 | 1,800 | 14,400 | | | | |
| 1877 | 1,950 | 15,700 | | | | |
| 1878 | 2,100 | 16,800 | | | | |
| 1879 | 3,500 | 28,000 | | | | |
| 1880 | 3,700 | 29,600 | 300 | $3,300 | | |
| 1881 | 1,760 | 15,840 | | | | |
| 1882 | 5,890 | 53,010 | | | | |

PACK OF SALTED SALMON IN ALASKA, 1868 TO 1909—Continued.

| Year. | Salmon. | | Salmon bellies. | | Dry-salted salmon. | |
|---|---|---|---|---|---|---|
| | Barrels. | Value. | Barrels. | Value. | Pounds. | Value. |
| 1883 | 7,251 | $65,259 | | | | |
| 1884 | 6,106 | 54,954 | | | | |
| 1885 | 3,230 | 29,070 | | | | |
| 1886 | 4,861 | 43,749 | | | | |
| 1887 | 3,978 | 35,802 | | | | |
| 1888 | 9,500 | 85,500 | | | | |
| 1889 | 6,457 | 58,013 | | | | |
| 1890 | 18,039 | 162,351 | | | | |
| 1891 | 8,913 | 71,304 | | | | |
| 1892 | 17,374 | 140,057 | 53 | $815 | | |
| 1893 | 24,005 | 120,083 | | | | |
| 1894 | 32,011 | 176,060 | | | | |
| 1895 | 14,234 | 85,404 | | | | |
| 1896 | 9,314 | 65,198 | 150 | 1,200 | | |
| 1897 | 15,848 | 110,936 | 2,846 | 28,460 | | |
| 1898 | 22,670 | 181,360 | 580 | 5,800 | | |
| 1899 | 22,382 | 167,865 | 235 | 2,350 | | |
| 1900 | 31,852 | 238,890 | 2,353 | 23,530 | 511,400 | $10,228 |
| 1901 | 24,477 | 171,339 | 652 | 3,816 | | |
| 1902 | 30,384 | 212,688 | 328 | 2,952 | | |
| 1903 | 27,921 | 223,368 | 3,667 | 32,973 | 300,000 | 5,500 |
| 1904 | 13,674 | 89,209 | 208 | 1,950 | 966,812 | 16,180 |
| 1905 | 19,071 | 143,811 | 1,360 | 11,355 | 7,280,234 | 115,643 |
| 1906 | 17,283 | 126,194 | 1,338 | 13,644 | 1,107,680 | 16,969 |
| 1907 | 22,307 | 203,127 | 2,965 | 37,422 | 107,580 | 1,505 |
| 1908 | 31,472 | 266,713 | 7,600 | 85,994 | 20,800 | 416 |
| 1909 | 28,443 | 183,400 | 1,970 | 25,358 | 71,600 | 1,038 |
| 1910 | 12,779 | 111,634 | 1,626 | 19,007 | 22,178 | 554 |
| Total | 517,236 | 3,883,988 | 28,231 | 269,926 | 10,388,284 | 168,033 |

## MILD CURING INDUSTRY.

The beginning of this industry on the Pacific coast is of comparatively recent date, and the following table is complete, with the possible exception of a few tierces, which may not have been reported for the coastal rivers of Oregon:

NUMBER OF TIERCES OF MILD-CURED SALMON PACKED ON THE PACIFIC COAST FROM 1897 TO 1910.[a]

| Year. | Alaska. | British Columbia. | Puget Sound, Wash. | Grays Harbor, Wash. | Willapa Harbor, Wash. | Columbia River, (both sides). | Coastal rivers, Oreg. | Eel River, Cal. | Sacramento River, Cal. | Monterey Bay, Cal. | Total. |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1897 | | | | | | 400 | | | | | 400 |
| 1898 | 70 | | | | | 700 | | | | | 770 |
| 1899 | 130 | | | 375 | | 1,250 | | | | | 1,755 |
| 1900 | | | | | | 1,275 | | | 950 | | 2,225 |
| 1901 | 67 | | 600 | | | 3,000 | | | 3,100 | | 6,767 |
| 1902 | 67 | | 425 | | | 4,213 | 188 | | 2,325 | 504 | 7,722 |
| 1903 | 8 | | 824 | | | 6,725 | | | 3,600 | 354 | 11,511 |
| 1904 | 34 | | 1,250 | | | 9,088 | | 200 | 4,719 | 248 | 15,539 |
| 1905 | 189 | 1,175 | 3,000 | | | 9,805 | 415 | | 2,979 | 310 | 17,873 |
| 1906 | 1,126 | 957 | | | | 8,000 | 740 | 175 | 2,177 | 510 | 13,685 |
| 1907 | 1,657 | 1,993 | 2,060 | 20 | 100 | 6,070 | 740 | 140 | 4,102 | 582 | 17,464 |
| 1908 | 1,378 | 1,060 | | | | 4,960 | | | 3,243 | 252 | 10,893 |
| 1909 | 2,292 | 1,560 | 2,109 | 75 | 29 | 5,540 | 560 | 80 | 5,111 | 911 | 18,267 |
| 1910 | 3,357 | 1,638 | 2,435 | 67 | | 7,922 | 1,398 | | 5,516 | 75 | 22,408 |
| Total | 10,375 | 8,383 | 12,703 | 537 | 129 | 68,948 | 4,041 | 595 | 37,822 | 3,746 | 147,279 |

[a] The net weight of fish in a tierce is about 800 pounds. King, chinook, or spring salmon were used almostexclusively. From most places the data are complete from the time of the inception of the industry, but from a few minor places the data are somewhat fragmentary.

## IX. TRADE WITH OUTLYING POSSESSIONS.

As a result of the war with Spain the United States in 1898 acquired possession of Porto Rico, Guam, and the Philippine Islands, while in the same year Hawaii became a part of this country at its own request, and in 1900 two islands of the Samoan group were acquired by a partition agreement with Great Britain and Germany. The trade with the Philippine Islands is shown to date in the tables of exports and imports to foreign countries, but the trade with the other possessions has been eliminated from these tables and shown separately ever since their annexation to the United States.

### HAWAII.

The islands constituting this Territory, owing to their reciprocity treaty with this country for a number of years before annexation, purchased their supplies of salmon from the United States almost exclusively. In recent years the Territory has imported the following quantities of salmon from the mainland:

| Year. | Canned. | | All other, fresh or cured. |
|---|---|---|---|
| | Pounds. | Value. | |
| | | | *Value.* |
| 1907 | 1,126,217 | $89,286 | $64,232 |
| 1908 | 965,029 | 89,025 | 67,143 |
| 1909 | 1,440,410 | 121,716 | 73,848 |
| 1910 | 1,381,398 | 113,526 | 72,194 |

### PORTO RICO.

Of recent years, the following shipments of domestic salmon have been made to this island:

| Year. | Canned. | | All other, fresh or cured. |
|---|---|---|---|
| | Pounds. | Value. | |
| | | | *Value.* |
| 1907 | 604,627 | $53,916 | $2,893 |
| 1908 | 512,038 | 48,195 | 1,428 |
| 1909 | 381,171 | 34,777 | 3,810 |
| 1910 | 511,055 | 43,494 | 6,243 |

## GUAM.

Since annexation, this country and Japan have been competing for the trade of this island, which, in earlier years, Japan controlled quite largely. During the last two years, however, the United States has secured the advantage. The following table shows the extent of the trade, which is made up almost entirely of salted or pickled salmon:

| Year and country. | Pickled salmon. | | Fresh salmon. | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| 1905. | | | | |
| United States | 1,415 | $71 | ..... | ..... |
| Japan | 16,526 | 1,221 | ..... | ..... |
| 1907. | | | | |
| United States | 13,604 | 1,086 | ..... | ..... |
| Japan | 19,862 | 1,601 | ..... | ..... |
| 1908. | | | | |
| United States | 7,406 | 623 | 900 | $92 |
| Japan | 6,130 | 465 | ..... | ..... |
| 1909. | | | | |
| United States | 10,779 | 740 | ..... | ..... |
| Japan | 4,295 | 344 | ..... | ..... |
| 1910. | | | | |
| United States | ..... | ..... | ..... | ..... |
| Japan | ..... | ..... | ..... | ..... |

## TUTUILA, SAMOA.

The customs statistics lump the imports of fish under one general heading, thus making it impossible to show separately the imports of salmon.

## X. FOREIGN TRADE IN SALMON.

As we do not consume all of the salmon produced by our fisheries, it is necessary to find a foreign market for the surplus each season, but as canned salmon has become one of the staples of the world, there is not much difficulty in this respect, especially since our only competitors are Canada and Japan. The latter has not yet become much of a factor in the canned-salmon market, though she will as her fishing operations are extended. There is more competition in the pickled, fresh, and frozen markets, several European and Asiatic countries being large producers of these goods, as is Canada also, for a considerable proportion of which she is compelled to find an outside market.

### EXPORTS OF CANNED SALMON.

From the beginning of the industry a considerable proportion of the salmon canned has been exported, especially of the higher grades. In Europe the chief customer is Great Britain, taking about nine-tenths of all sent to European ports. Great Britain does not, however, consume this quantity, for a considerable part of her importations are reexported. On the North American Continent and adjacent islands the best customers are Mexico, Panama, and the British West Indies, in the order named. In South America, Peru, Argentina, and British Guiana were the leading markets in 1910. In 1908 Chile imported 4,196,060 pounds; in 1909 the importations dropped to 97,993 pounds, but increased in 1910 to 1,556,629 pounds. In Asia, Hongkong and China import canned salmon, although neither buys great quantities. The islands of the Pacific and Indian Oceans are large consumers. British Australasia took 5,474,818 pounds, valued at $551,312, in 1910, and other good customers were the British East Indies and British, French, and German Oceania. In Africa the British and Portuguese possessions are the largest importers.

The movements of these products are naturally often influenced favorably or adversely as the tariffs of the various countries in which they are marketed are raised or lowered.

The following table shows the yearly exports of domestic canned salmon and the countries to which exported for the period from 1900 to 1910, inclusive:

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910.

| Countries. | 1900 | | 1901 | | 1902 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| North America: | | | | | | |
| Dominion of Canada— | | | | | | |
| Nova Scotia, New Brunswick, etc. | | | | | 10 | $1 |
| Quebec, Ontario, Manitoba, etc. | 24,137 | $2,514 | 101 | $10 | 22,442 | 2,493 |
| British Columbia | 382,811 | 33,454 | 1,725,251 | 223,230 | 1,866,272 | 159,682 |
| Newfoundland and Labrador | | | | | 810 | 73 |
| Miquelon, Langley, etc. | 240 | 20 | | | | |
| Mexico | 162,785 | 14,806 | 160,425 | 14,967 | 387,905 | 31,041 |
| Central American States— | | | | | | |
| British Honduras | 16,488 | 1,604 | 19,331 | 2,054 | 23,467 | 2,370 |
| Costa Rica | 70,458 | 6,114 | 69,135 | 6,768 | 70,036 | 5,954 |
| Guatemala | 2,666 | 277 | 11,361 | 1,151 | 15,325 | 1,324 |
| Honduras | 7,193 | 677 | 7,681 | 776 | 4,924 | 498 |
| Nicaragua | 26,647 | 2,684 | 21,543 | 2,256 | 17,125 | 1,635 |
| Salvador | 550 | 60 | 550 | 55 | 1,828 | 161 |
| Bermuda | 59,672 | 6,158 | 63,786 | 7,398 | 76,456 | 7,768 |
| West Indies— | | | | | | |
| British | 259,249 | 25,651 | 315,209 | 33,635 | 242,999 | 24,191 |
| Danish | 9,085 | 873 | 8,612 | 929 | 14,526 | 1,390 |
| Dutch | 13,303 | 1,610 | 16,591 | 1,944 | 13,112 | 1,506 |
| French | 432 | 45 | 1,084 | 127 | 960 | 96 |
| Haiti | 468 | 44 | 595 | 65 | 920 | 88 |
| Santo Domingo | 2,764 | 297 | 1,899 | 192 | 1,531 | 140 |
| Cuba | 8,406 | 786 | 20,407 | 1,883 | 20,196 | 1,618 |
| Porto Rico | 4,394 | 390 | | | | |
| South America: | | | | | | |
| Argentina | 104,367 | 8,822 | 127,751 | 10,916 | 88,622 | 7,816 |
| Bolivia | | | 240 | 37 | 15,110 | 1,147 |
| Brazil | 637,638 | 76,152 | 207,033 | 23,506 | 87,800 | 8,350 |
| Chile | 647,328 | 61,800 | 645,323 | 64,059 | 384,766 | 28,529 |
| Colombia | 92,868 | 9,075 | 97,163 | 9,975 | 86,046 | 7,451 |
| Ecuador | 50,387 | 5,631 | 98,587 | 10,387 | 24,937 | 1,868 |
| Guiana— | | | | | | |
| British | 168,718 | 16,197 | 136,192 | 14,807 | 146,502 | 14,604 |
| Dutch | 43,096 | 3,553 | 61,334 | 6,542 | 92,971 | 8,718 |
| French | 3,240 | 299 | 2,248 | 261 | 8,316 | 850 |
| Peru | 75,621 | 7,392 | 124,823 | 12,526 | 313,476 | 24,444 |
| Uruguay | 2,837 | 285 | 9,408 | 933 | 1,016 | 104 |
| Venezuela | 42,125 | 3,712 | 66,911 | 6,913 | 42,436 | 4,026 |
| Europe: | | | | | | |
| Austria-Hungary | 2,208 | 309 | | | 250 | 25 |
| Azores, and Madeira Islands | 48 | 7 | 950 | 92 | | |
| Belgium | 31,118 | 3,186 | 5,800 | 600 | 336 | 39 |
| Denmark | 24,492 | 2,455 | 3,168 | 326 | 860 | 92 |
| France | 22,544 | 2,130 | 61,790 | 6,565 | 23,956 | 1,889 |
| Germany | 16,110 | 1,431 | 77,921 | 7,567 | 10,905 | 1,068 |
| Italy | 120 | 10 | 2,496 | 244 | | |
| Malta, Gozo, etc. | | | 141 | 21 | | |
| Netherlands | 3,048 | 299 | 288 | 30 | 4,800 | 400 |
| Portugal | 19,776 | 1,779 | | | 336 | 35 |
| Russia, on Baltic and White Seas | | | | | 8,400 | 932 |
| Spain | | | 1,536 | 151 | 675 | 67 |
| Sweden and Norway | 1,168 | 112 | 720 | 70 | 72 | 8 |
| Switzerland | 24 | 3 | | | | |
| United Kingdom | 18,820,453 | 1,870,004 | 31,722,853 | 3,219,196 | 30,632,961 | 2,620,729 |
| Asia and Oceania: | | | | | | |
| Aden | 216 | 22 | | | | |
| Chinese Empire | 40,960 | 4,255 | 149,295 | 15,263 | 117,043 | 8,716 |
| China—Russian | | | 20,634 | 2,058 | 9,460 | 772 |
| Hongkong | 63,210 | 6,488 | 78,960 | 8,056 | 551,860 | 40,261 |
| Japan | 11,560 | 1,200 | 285,036 | 28,990 | 14,578 | 1,220 |
| Korea | | | 1,105 | 115 | 2,208 | 179 |
| Russia, Asiatic | | | 1,495 | 145 | 6,572 | 521 |
| Turkey in Asia | | | 144 | 16 | | |
| East Indies— | | | | | | |
| British | 538,180 | 55,976 | 312,805 | 31,528 | 733,685 | 56,912 |
| Dutch | | | 3,960 | 400 | 161,940 | 12,093 |

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

| Countries. | 1900 | | 1901 | | 1902 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Asia and Oceania—Continued. | | | | | | |
| British Australasia | 2,804,004 | $283,110 | 3,442,085 | $343,540 | 7,131,641 | $599,671 |
| British Oceania | | | | | 151,998 | 10,555 |
| French Oceania | 103,940 | 10,732 | 118,355 | 12,026 | 142,570 | 11,355 |
| German Oceania | | | 8,480 | 874 | 12,900 | 997 |
| Guam[a] | 480 | 50 | | | | |
| Hawaii[b] | 860,682 | 84,808 | | | | |
| Philippine Islands | 1,160 | 120 | 39,316 | 3,925 | 718,876 | 46,712 |
| Tonga, Samoa, and all other | 112,380 | 11,646 | 73,040 | 7,168 | | |
| Tutuila[c] | | | | | 21,176 | 1,451 |
| Africa: | | | | | | |
| British Africa | 632,012 | 57,387 | 816,433 | 79,063 | 2,581,088 | 219,233 |
| Canary Islands | | | 656 | 66 | | |
| French Africa | 4,320 | 421 | 4,080 | 415 | 200 | 21 |
| Liberia | 312 | 30 | | | | |
| Portuguese Africa | 47,812 | 4,696 | 35,384 | 3,459 | 52,726 | 4,931 |
| All other Africa | | | | | 6,200 | 582 |
| Total | 27,082,370 | 2,693,648 | 41,289,500 | 4,230,271 | 47,173,114 | 3,991,402 |
| RECAPITULATION. | | | | | | |
| Europe | 18,941,109 | 1,881,725 | 31,877,663 | 3,234,862 | 30,683,551 | 2,625,284 |
| North America | 1,051,808 | 98,064 | 2,443,561 | 297,440 | 2,780,844 | 242,029 |
| South America | 1,868,225 | 192,918 | 1,577,013 | 160,862 | 1,291,998 | 107,907 |
| Asia | 654,126 | 67,941 | 853,434 | 86,571 | 1,597,346 | 120,674 |
| Oceania | 3,882,646 | 390,466 | 3,681,276 | 367,533 | 8,179,161 | 670,741 |
| Africa | 684,456 | 62,534 | 856,553 | 83,003 | 2,640,214 | 224,767 |

| Countries. | 1903 | | 1904 | | 1905 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| North America: | | | | | | |
| Dominion of Canada | | | | | 290,850 | $21,121 |
| Nova Scotia, New Brunswick, etc. | | | 49 | $4 | | |
| Quebec, Ontario, Manitoba, etc. | 43,107 | $5,171 | 153,697 | 9,558 | | |
| British Columbia | 3,246,082 | 287,212 | 1,086,370 | 95,021 | | |
| Newfoundland and Labrador | | | | | 240 | 25 |
| Mexico | 356,951 | 26,787 | 538,949 | 38,691 | 493,371 | 40,597 |
| Central American States— | | | | | | |
| British Honduras | 24,187 | 2,316 | 28,044 | 2,534 | 28,959 | 2,534 |
| Costa Rica | 36,806 | 3,072 | 58,828 | 4,668 | 93,580 | 8,179 |
| Guatemala | 3,527 | 295 | 15,732 | 1,131 | 20,498 | 1,583 |
| Honduras | 7,455 | 716 | 12,428 | 1,090 | 14,434 | 1,221 |
| Nicaragua | 20,089 | 1,771 | 28,159 | 2,394 | 42,103 | 3,146 |
| Panama[d] | | | 18,466 | 1,671 | 112,320 | 9,211 |
| Salvador | 3,360 | 252 | 4,304 | 326 | 2,296 | 184 |
| Bermuda | 64,264 | 6,792 | 36,022 | 3,778 | 33,821 | 3,634 |
| West Indies— | | | | | | |
| British | 418,636 | 38,434 | 409,219 | 37,389 | 366,747 | 34,262 |
| Danish | 9,647 | 903 | 7,442 | 752 | 9,474 | 965 |
| Dutch | 22,981 | 2,480 | 17,878 | 1,999 | 13,051 | 1,419 |
| French | 892 | 92 | 984 | 86 | 660 | 64 |
| Haiti | 2,496 | 238 | 2,115 | 228 | 1,611 | 164 |
| Santo Domingo | 3,290 | 335 | 7,660 | 719 | 4,855 | 452 |
| Cuba | 21,636 | 1,789 | 24,677 | 2,324 | 36,903 | 3,373 |
| South America: | | | | | | |
| Argentina | 72,445 | 6,808 | 66,275 | 6,612 | 120,586 | 11,263 |
| Bolivia | 384 | 40 | 672 | 80 | 170 | 17 |
| Brazil | 88,740 | 8,481 | 114,033 | 11,742 | 1881342 | 17,908 |
| Chile | 1,044,490 | 59,354 | 1,218,266 | 72,205 | 821,171 | 56,160 |
| Colombia | 149,272 | 11,194 | 118,269 | 10,104 | 81,239 | 7,491 |
| Ecuador | 45,126 | 3,115 | 59,266 | 4,041 | 121,894 | 7,941 |
| Guiana— | | | | | | |
| British | 172,300 | 16,829 | 112,360 | 11,226 | 135,424 | 13,617 |
| Dutch | 52,138 | 4,959 | 78,464 | 8,280 | 45,231 | 4,797 |
| French | 18,752 | 1,805 | 11,169 | 1,307 | 11,684 | 1,228 |
| Peru | 89,440 | 7,309 | 214,982 | 15,530 | 151,832 | 11,369 |
| Uruguay | 2,140 | 185 | 2,246 | 225 | 3,250 | 325 |
| Venezuela | 20,987 | 1,839 | 59,857 | 5,981 | 28,005 | 2,825 |

[a] Guam was annexed to the United States in 1898.
[b] Hawaii was annexed to the United States in 1898.
[c] Tutuila was acquired in 1898.
[d] Panama separated from Colombia in 1903.

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

| Countries. | 1903 | | 1904 | | 1905 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Europe: | | | | | | |
| Austria-Hungary | 400 | $25 | 384 | $36 | | |
| Azores, and Madeira Islands | | | 48 | 5 | 384 | $41 |
| Belgium | 788 | 73 | 480 | 53 | 9,760 | 1,019 |
| Denmark | 80 | 8 | 100 | 8 | | |
| France | 2,400 | 260 | 4,800 | 600 | 21,995 | 2,262 |
| Germany | 32,268 | 2,470 | 18,790 | 1,747 | 1,210 | 122 |
| Italy | 1,120 | 114 | 5,232 | 556 | 5,760 | 465 |
| Netherlands | 1,072 | 124 | 4,072 | 414 | 3,250 | 349 |
| Norway [a] | 96 | 10 | 1,440 | 150 | | |
| Spain | 3,108 | 316 | 1,400 | 140 | 2,700 | 249 |
| Sweden [a] | | | 70 | 7 | 96 | 10 |
| Switzerland | 240 | 24 | | | | |
| United Kingdom | 35,369,196 | 3,121,774 | 33,555,080 | 3,505,102 | 21,026,108 | 1,872,992 |
| Asia and Oceania: | | | | | | |
| Aden | | | | | 2,520 | 180 |
| Chinese Empire | 166,522 | 13,602 | 218,142 | 18,770 | 249,386 | 17,587 |
| China—Russian | 53,368 | 5,111 | 40,000 | 3,932 | | |
| Hongkong | 814,008 | 56,225 | 160,367 | 11,870 | 518,423 | 36,635 |
| Japan | 13,536 | 1,015 | 11,817,343 | 841,461 | 2,437,434 | 162,524 |
| Korea | 2,152 | 179 | 3,888 | 292 | 2,572 | 186 |
| Russia, Asiatic | 48 | 4 | 482 | 41 | | |
| Siam | | | | | 384 | 31 |
| East Indies— | | | | | | |
| British | 473,740 | 39,367 | 636,320 | 44,669 | 673,897 | 55,599 |
| French | | | | | 720 | 69 |
| Dutch | 235,680 | 19,256 | 119,216 | 9,018 | 109,476 | 7,893 |
| All other Asia | 240 | 24 | 10 | 1 | | |
| British Australasia | 4,268,652 | 360,720 | 3,136,728 | 290,307 | 4,075,094 | 389,518 |
| British Oceania | 36,018 | 2,290 | 28,670 | 1,941 | 42,624 | 3,645 |
| French Oceania | 153,696 | 12,179 | 185,848 | 15,305 | 133,204 | 11,414 |
| German Oceania | 451,824 | 26,614 | 340,464 | 19,326 | 324,888 | 20,651 |
| Philippine Islands | 601,324 | 42,702 | 206,896 | 14,970 | 681,636 | 42,700 |
| Africa: | | | | | | |
| British Africa | 1,454,226 | 127,921 | 794,758 | 77,911 | 1,259,269 | 121,120 |
| Canary Islands | 144 | 15 | | | 900 | 90 |
| French Africa | 2,220 | 207 | 3,200 | 320 | 4,800 | 460 |
| Liberia | 384 | 41 | 140 | 14 | 140 | 14 |
| Portuguese Africa | 167,964 | 17,043 | 137,640 | 13,906 | 200,826 | 20,365 |
| Turkey in Africa—Egypt | | | 388 | 30 | 2,448 | 204 |
| All other Africa | 5,200 | 506 | | | | |
| Total | 50,353,334 | 4,350,791 | 55,924,278 | 5,224,598 | 35,066,555 | 3,035,469 |
| RECAPITULATION. | | | | | | |
| Europe | 35,410,768 | 3,125,197 | 33,591,896 | 3,508,818 | 21,071,263 | 1,877,509 |
| North America | 4,285,406 | 378,655 | 2,446,023 | 204,363 | 1,565,773 | 132,134 |
| South America | 1,756,214 | 121,918 | 2,055,859 | 147,333 | 1,708,828 | 134,941 |
| Asia | 1,759,294 | 134,783 | 12,995,768 | 930,054 | 3,994,862 | 280,704 |
| Oceania | 5,511,514 | 444,505 | 3,898,606 | 341,849 | 5,257,446 | 467,928 |
| Africa | 1,630,138 | 145,733 | 936,126 | 92,181 | 1,468,383 | 142,253 |

| Countries. | 1906 | | 1907 | | 1908 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| North America: | | | | | | |
| Dominion of Canada | 236,664 | $14,814 | 793,247 | $65,356 | 7,320 | $587 |
| Mexico | 699,002 | 56,747 | 877,989 | 73,582 | 1,068,824 | 94,278 |
| Central American States— | | | | | | |
| British Honduras | 43,155 | 3,639 | 36,020 | 3,214 | 32,632 | 3,080 |
| Costa Rica | 106,879 | 8,968 | 148,157 | 12,260 | 138,421 | 12,260 |
| Guatemala | 26,925 | 1,989 | 31,242 | 2,535 | 29,777 | 2,319 |
| Honduras | 15,148 | 1,319 | 23,508 | 2,048 | 33,955 | 3,202 |
| Nicaragua | 39,949 | 3,022 | 41,106 | 3,335 | 27,721 | 2,302 |
| Panama [b] | 308,624 | 25,965 | 443,687 | 38,642 | 487,079 | 46,883 |
| Salvador | 2,880 | 197 | 4,092 | 331 | 5,854 | 467 |
| Bermuda | 24,679 | 2,406 | 29,139 | 2,711 | 25,183 | 2,579 |
| West Indies— | | | | | | |
| British | 471,814 | 43,368 | 515,664 | 46,510 | 687,620 | 64,275 |
| Danish | 9,713 | 1,011 | 13,336 | 1,340 | 15,604 | 1,658 |
| Dutch | 11,643 | 1,230 | 24,275 | 2,428 | 21,368 | 2,234 |
| French | 200 | 20 | 100 | 9 | 96 | 11 |
| Haiti | 2,953 | 291 | 914 | 91 | 864 | 85 |
| Santo Domingo | 11,688 | 1,137 | 9,278 | 891 | 13,887 | 1,371 |
| Cuba | 57,441 | 5,823 | 60,904 | 5,855 | 57,970 | 5,288 |

[a] Sweden and Norway separated in 1905. [b] Panama separated from Colombia in 1903.

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

| Countries. | 1906 | | 1907 | | 1908 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| South America: | | | | | | |
| Argentina | 200,206 | $20,339 | 262,667 | $25,801 | 394,306 | $30,759 |
| Bolivia | 1,720 | 181 | 18,951 | 1,577 | 11,762 | 1,217 |
| Brazil | 188,278 | 18,975 | 150,592 | 14,880 | 146,826 | 14,055 |
| Chile | 4,462,147 | 154,396 | 4,168,876 | 286,229 | 4,196,060 | 295,194 |
| Colombia | 51,987 | 4,667 | 41,964 | 3,850 | 51,786 | 4,880 |
| Ecuador | 80,876 | 5,855 | 203,930 | 15,599 | 174,920 | 12,486 |
| Guiana— | | | | | | |
| British | 120,016 | 12,391 | 116,120 | 12,202 | 140,514 | 16,014 |
| Dutch | 65,654 | 6,246 | 66,530 | 6,494 | 59,390 | 6,053 |
| French | 12,650 | 1,305 | 17,950 | 1,829 | 23,218 | 2,599 |
| Peru | 269,858 | 20,342 | 551,160 | 40,431 | 316,701 | 22,229 |
| Uruguay | 10,436 | 1,075 | 16,124 | 1,546 | 17,934 | 1,693 |
| Venezuela | 35,775 | 3,280 | 44,826 | 4,336 | 37,583 | 3,564 |
| Europe: | | | | | | |
| Austria-Hungary | 1,260 | 135 | 1,220 | 112 | ..... | ..... |
| Azores, and Madeira Islands | ..... | ..... | 883 | 89 | ..... | ..... |
| Belgium | 500 | 60 | ..... | ..... | ..... | ..... |
| Denmark | 40,200 | 4,112 | ..... | ..... | ..... | ..... |
| France | 29,980 | 3,000 | ..... | ..... | 10,575 | 961 |
| Germany | 4,896 | 420 | 9,150 | 976 | 45,977 | 4,572 |
| Italy | 4,920 | 413 | 10,230 | 861 | ..... | ..... |
| Malta, Gozo, etc | 420 | 36 | ..... | ..... | ..... | ..... |
| Netherlands | 8,280 | 959 | 11,098 | 850 | ..... | ..... |
| Norway[a] | 40,200 | 3,981 | ..... | ..... | 17,670 | 1,860 |
| Portugal | ..... | ..... | ..... | ..... | 7,577 | 731 |
| Spain | 1,930 | 193 | 3,208 | 303 | 27,900 | 2,735 |
| Sweden[a] | 10,000 | 1,050 | ..... | ..... | 10,500 | 1,000 |
| United Kingdom | 31,918,816 | 2,739,284 | 7,720,991 | 788,245 | 13,200,887 | 1,193,516 |
| Asia and Oceania: | | | | | | |
| Aden | 480 | 50 | ..... | ..... | ..... | ..... |
| Chinese Empire | 32,189 | 2,321 | 59,110 | 4,386 | 23,126 | 2,154 |
| Hongkong | 105,581 | 7,652 | 122,482 | 9,959 | 144,624 | 13,367 |
| Japan | 9,051 | 713 | 22,881 | 1,775 | 2,472 | 269 |
| Korea | 1,632 | 128 | 1,500 | 129 | 1,156 | 126 |
| Russia, Asiatic | 1,440 | 102 | 770 | 84 | 582 | 65 |
| Siam | ..... | ..... | 1,440 | 90 | 3,264 | 282 |
| Turkey in Asia | 750 | 90 | ..... | ..... | 290 | 30 |
| East Indies— | | | | | | |
| British | 477,234 | 38,263 | 1,043,618 | 75,001 | 702,169 | 59,254 |
| French | 16,262 | 1,162 | ..... | ..... | 720 | 75 |
| Dutch | 134,796 | 9,692 | 167,590 | 13,940 | 126,168 | 11,286 |
| British Australasia | 5,230,076 | 426,814 | 5,451,378 | 462,648 | 3,654,756 | 330,029 |
| British Oceania | 11,952 | 923 | 40,080 | 2,958 | 14,660 | 1,278 |
| French Oceania | 125,998 | 10,274 | 137,472 | 11,494 | 185,608 | 15,732 |
| German Oceania | 214,920 | 14,503 | 156,939 | 11,267 | 105,696 | 8,345 |
| Philippine Islands | 757,400 | 56,743 | 933,288 | 63,838 | 1,171,834 | 84,533 |
| Africa: | | | | | | |
| British Africa | 1,029,787 | 87,881 | 504,848 | 47,748 | 454,892 | 43,883 |
| Canary Islands | 782 | 76 | 144 | 17 | ..... | ..... |
| French Africa | 144 | 14 | ..... | ..... | 48 | 6 |
| German Africa | ..... | ..... | 600 | 60 | ..... | ..... |
| Liberia | ..... | ..... | ..... | ..... | 5,079 | 482 |
| Portuguese Africa | 161,178 | 16,001 | 104,837 | 10,307 | 83,640 | 8,325 |
| Turkey in Africa—Egypt | 2,400 | 200 | ..... | ..... | ..... | ..... |
| Total | 45,944,414 | 3,847,943 | 25,218,105 | 2,183,049 | 28,226,045 | 2,438,518 |
| RECAPITULATION. | | | | | | |
| Europe | 32,061,402 | 2,753,643 | 7,756,780 | 791,436 | 13,321,086 | 1,205,375 |
| North America | 2,069,357 | 171,946 | 3,052,658 | 261,138 | 2,654,175 | 242,879 |
| South America | 3,4991603 | 249,052 | 5,659,690 | 414,774 | 5,571,000 | 410,743 |
| Asia | 779,415 | 60,173 | 1,419,391 | 105,364 | 1,004,571 | 86,908 |
| Oceania | 6,340,346 | 509,257 | 6,719,157 | 552,205 | 5,131,554 | 439,917 |
| Africa | 1,194,291 | 103,872 | 610,429 | 58,132 | 543,659 | 52,696 |

[a] Sweden and Norway separated in 1905.

EXPORTS, BY COUNTRIES, OF DOMESTIC CANNED SALMON, 1900 TO 1910—Continued.

| Countries. | 1909 | | 1910 | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| North America: | | | | |
| Dominion of Canada | 229,934 | $21,773 | 99,022 | $7,570 |
| Mexico | 756,052 | 58,124 | 697,217 | 50,782 |
| Central American States— | | | | |
| British Honduras | 35,195 | 3,261 | 28,310 | 2,606 |
| Costa Rica | 118,266 | 9,828 | 157,946 | 12,237 |
| Guatemala | 13,957 | 1,117 | 16,821 | 1,361 |
| Honduras | 14,112 | 1,179 | 16,240 | 1,361 |
| Nicaragua | 21,534 | 1,656 | 28,116 | 2,066 |
| Panama[a] | 528,228 | 50,940 | 482,717 | 45,404 |
| Salvador | 9,184 | 754 | 5,498 | 423 |
| Bermuda | 23,774 | 2,461 | 26,484 | 2,383 |
| West Indies— | | | | |
| British | 358,114 | 36,644 | 548,561 | 53,939 |
| Danish | 14,848 | 1,568 | 14,655 | 1,512 |
| Dutch | 16,621 | 1,883 | 9,838 | 1,160 |
| French | 564 | 69 | 196 | 18 |
| Haiti | 2,184 | 203 | 2,038 | 185 |
| Santo Domingo | 13,258 | 1,306 | 22,120 | 2,058 |
| Cuba | 53,580 | 5,277 | 68,737 | 6,486 |
| South America: | | | | |
| Argentina | 259,192 | 17,030 | 229,461 | 15,690 |
| Bolivia | 6,184 | 647 | 33,502 | 2,941 |
| Brazil | 176,150 | 17,109 | 267,354 | 28,241 |
| Chile | 97,993 | 6,918 | 1,556,629 | 92,259 |
| Colombia | 58,518 | 5,767 | 114,274 | 9,494 |
| Ecuador | 139,868 | 10,952 | 272,411 | 16,487 |
| Guiana— | | | | |
| British | 255,039 | 25,981 | 222,398 | 22,133 |
| Dutch | 100,259 | 9,906 | 57,509 | 6,297 |
| French | 22,816 | 2,164 | 17,724 | 1,784 |
| Peru | 295,885 | 22,640 | 367,676 | 24,817 |
| Uruguay | 15,140 | 1,330 | 11,730 | 1,167 |
| Venezuela | 34,618 | 3,058 | 43,144 | 4,887 |
| Europe: | | | | |
| Azores, and Madeira Islands | | | 100 | 12 |
| Denmark | 192 | 18 | | |
| France | | | 1,878 | 223 |
| Germany | 17,096 | 1,757 | 424 | 51 |
| Italy | 5,148 | 500 | | |
| Netherlands | 11,612 | 1,017 | 9,744 | 1,020 |
| Russia on Baltic and White Seas | 2,050 | 205 | 11,580 | 1,210 |
| Spain | 3,160 | 311 | 5,100 | 506 |
| Sweden[b] | 20,000 | 1,940 | | |
| United Kingdom | 22,969,218 | 2,201,446 | 44,737,072 | 4,709,160 |
| Asia and Oceania: | | | | |
| Chinese Empire | 53,448 | 4,887 | 28,522 | 2,688 |
| China—British leased territory | | | 3,120 | 345 |
| Hongkong | 103,448 | 9,707 | 121,558 | 12,234 |
| Japan | 15,078 | 1,245 | 3,716 | 352 |
| Korea | 2,652 | 266 | 2,016 | 220 |
| Russia, Asiatic | 5,380 | 394 | | |
| Siam | 14,880 | 1,025 | 1,008 | 93 |
| East Indies— | | | | |
| British | 989,592 | 85,094 | 1,246,751 | 101,619 |
| French | 528 | 56 | | |
| Dutch | 201,696 | 16,908 | 189,604 | 15,920 |
| All other Asia | | | 480 | 45 |
| British Australasia | 5,704,960 | 590,094 | 5,474,818 | 551,312 |
| British Oceania | 109,936 | 7,437 | 66,826 | 5,160 |
| French Oceania | 162,336 | 14,570 | 241,200 | 22,589 |
| German Oceania | 279,792 | 18,311 | 360,576 | 22,554 |
| Philippine Islands | 1,126,470 | 74,792 | 5,425,404 | 396,604 |
| Africa: | | | | |
| British Africa | 484,196 | 48,220 | 357,051 | 37,707 |
| Canary Islands | 510 | 51 | | |
| German Africa | 350 | 36 | 910 | 92 |
| Portuguese Africa | 162,314 | 14,604 | 151,470 | 14,674 |
| Turkey in Africa—Egypt | | | 1,440 | 120 |
| Total | 36,117,109 | 3,416,436 | 63,860,696 | 6,314,258 |
| RECAPITULATION. | | | | |
| Europe | 23,028,476 | 2,207,194 | 44,765,898 | 4,712,182 |
| North America | 2,209,405 | 198,043 | 2,224,516 | 191,551 |
| South America | 1,461,662 | 123,502 | 3,193,812 | 226,197 |
| Asia | 1,386,702 | 119,582 | 1,596,775 | 133,516 |
| Oceania | 7,383,494 | 705,204 | 11,568,824 | 998,219 |
| Africa | 647,370 | 62,911 | 510,871 | 52,593 |

[a] Panama separated from Colombia in 1903.

[b] Sweden and Norway separated in 1898.

The table following shows for the past 11 years the customs districts from which the canned salmon was exported. Up to 1910 about two-thirds of the total exports have gone from the port of San Francisco, while about one-fifth of the total passed through the port of Puget Sound, Wash. In 1910, however, the exports from Puget Sound exceeded those from San Francisco. The only other port through which any considerable quantity is shipped is New York City. It is usual now to load the salmon on steamers and sailing vessels at San Francisco and the Puget Sound cities to go direct to Europe.

EXPORTS, BY CUSTOMS DISTRICTS, OF CANNED SALMON, 1900 TO 1910.

| Customs districts from which exported. | 1900 | | 1901 | | 1902 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Atlantic ports: | | | | | | |
| Baltimore, Md | 648 | $65 | 334,580 | $33,053 | 324 | $34 |
| Bangor, Me | | | | | 10 | 1 |
| Boston and Charlestown, Mass | 222,770 | 20,488 | 192,676 | 27,372 | 172,110 | 20,224 |
| New York, N. Y | 3,485,326 | 340,538 | 7,960,104 | 847,294 | 4,365,074 | 407,009 |
| Philadelphia, Pa | 110,500 | 9,100 | 77,000 | 9,050 | | |
| Savannah, Ga | 1,012 | 81 | 582 | 72 | 480 | 60 |
| St. Johns, Fla | | | | | 75 | 7 |
| Norfolk and Portsmouth, Va | | | 269,380 | 30,888 | | |
| Charleston, S. C | 400 | 30 | | | | |
| Gulf ports: | | | | | | |
| Key West, Fla | | | 400 | 43 | | |
| Mobile, Ala | 10,536 | 958 | 7,340 | 816 | 11,032 | 1,055 |
| New Orleans, La | 28,332 | 2,472 | 47,685 | 4,567 | 39,084 | 3,910 |
| Mexican border ports: | | | | | | |
| Arizona | 6,253 | 706 | 18,104 | 1,869 | 23,879 | 2,350 |
| Brazos de Santiago, Tex | 168 | 21 | 816 | 115 | 300 | 29 |
| Paso del Norte, Tex | 23,843 | 2,134 | 1,220 | 98 | 164,167 | 13,119 |
| Pacific ports: | | | | | | |
| Alaska | 289 | 38 | 4,859 | 291 | 3,636 | 558 |
| Hawaii | | | | | 48 | 4 |
| Puget Sound, Wash | 1,477,232 | 144,059 | 2,271,306 | 282,441 | 9,864,259 | 872,912 |
| San Diego, Cal | 3,094 | 220 | 3,574 | 293 | 6,202 | 487 |
| San Francisco, Cal | 21,611,030 | 2,164,904 | 30,014,055 | 2,983,982 | 32,327,572 | 2,654,020 |
| Willamette, Oreg | 76,800 | 5,320 | 43,318 | 3,517 | 155,500 | 11,250 |
| Northern border and Lake ports: | | | | | | |
| Detroit, Mich | | | 26,200 | 2,700 | | |
| Minnesota, Minn | | | 101 | 10 | | |
| Vermont, Vt | 120 | 12 | | | | |
| Duluth, Minn | 24,000 | 2,500 | 16,200 | 1,800 | 39,312 | 4,368 |
| Memphremagog, Vt | 17 | 2 | | | 50 | 5 |
| Total | 27,082,370 | 2,693,648 | 41,289,500 | 4,230,271 | 47,173,114 | 3,991,402 |
| RECAPITULATION. | | | | | | |
| Atlantic ports | 3,820,656 | 370,302 | 8,834,322 | 947,729 | 4,538,073 | 427,335 |
| Gulf ports | 38,868 | 3,430 | 55,425 | 5,426 | 50,116 | 4,965 |
| Mexican border ports | 30,264 | 2,861 | 20,140 | 2,082 | 188,346 | 15,498 |
| Pacific ports | 23,168,145 | 2,314,541 | 32,337,112 | 3,270,524 | 42,357,217 | 3,539,231 |
| Northern border and Lake ports | 24,137 | 2,514 | 42,501 | 4,510 | 39,362 | 4,373 |

EXPORTS, BY CUSTOMS DISTRICTS, OF CANNED SALMON, 1900 TO 1910—Continued.

| Customs districts from which exported. | 1903 | | 1904 | | 1905 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Atlantic ports: | | | | | | |
| Baltimore, Md | 840 | $92 | 490 | $50 | 576 | $62 |
| Bangor, Me | | | 121 | 9 | 294 | 26 |
| Boston and Charlestown, Mass | 104,750 | 12,266 | 2,400 | 215 | | |
| New York, N. Y | 5,627,654 | 599,393 | 2,129,523 | 214,016 | 2,683,775 | 266,599 |
| Philadelphia, Pa | 540 | 54 | 587 | 42 | 8,858 | 576 |
| Providence, R. I | 685 | 63 | | | | |
| Gulf ports: | | | | | | |
| Key West, Fla | | | 1,500 | 125 | 460 | 23 |
| Mobile, Ala | 9,612 | 824 | 9,203 | 811 | 7,102 | 561 |
| New Orleans, La | 44,404 | 4,261 | 61,909 | 5,503 | 89,999 | 7,841 |
| Tampa, Fla | | | 180 | 16 | | |
| Mexican border ports: | | | | | | |
| Arizona | 26,988 | 2,803 | 7,568 | 745 | 20,845 | 1,878 |
| Brazos de Santiago, Tex | | | 96 | 7 | | |
| Paso del Norte, Tex | 103,375 | 8,938 | 347,218 | 23,401 | 262,014 | 20,687 |
| Saluria, Tex | | | 366 | 30 | 6,580 | 583 |
| Pacific ports: | | | | | | |
| Alaska | | | 153,600 | 9,550 | 4,848 | 557 |
| Hawaii | | | 48 | 7 | 148 | 15 |
| Puget Sound, Wash | 16,527,456 | 1,549,319 | 19,766,003 | 1,655,666 | 4,444,562 | 326,485 |
| San Diego, Cal | 5,897 | 421 | 5,678 | 422 | 3,594 | 259 |
| San Francisco, Cal | 27,448,182 | 2,138,019 | 33,212,614 | 3,303,292 | 27,498,325 | 2,406,422 |
| Willamette, Oreg | 409,444 | 29,142 | 224,549 | 10,628 | 5,775 | 531 |
| Oregon, Oreg | 400 | 25 | | | | |
| Northern border and Lake ports: | | | | | | |
| Detroit, Mich | | | 580 | 58 | | |
| North and South Dakota | | | 20 | 2 | | |
| Superior, Mich | | | | | 28,800 | 2,364 |
| Vermont, Vt | 74 | 7 | 25 | 3 | | |
| Duluth, Minn | 43,033 | 5,164 | | | | |
| Total | 50,353,334 | 4,350,791 | 55,924,278 | 5,224,598 | 35,066,555 | 3,035,469 |
| RECAPITULATION. | | | | | | |
| Atlantic ports | 5,734,469 | 611,868 | 2,133,121 | 214,332 | 2,693,503 | 267,263 |
| Gulf ports | 54,016 | 5,085 | 72,792 | 6,455 | 97,561 | 8,425 |
| Mexican border ports | 130,363 | 11,741 | 355,248 | 24,183 | 289,439 | 23,148 |
| Pacific ports | 44,391,379 | 3,716,926 | 53,362,492 | 4,979,565 | 31,957,252 | 2,734,269 |
| Northern border and Lake ports | 43,107 | 5,171 | 625 | 63 | 28,800 | 2,364 |

| Customs districts from which exported. | 1906 | | 1907 | | 1908 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Atlantic ports: | | | | | | |
| Baltimore, Md | 196 | $21 | 156 | $28 | 301 | $37 |
| New York, N. Y | 3,275,875 | 318,128 | 2,313,335 | 227,646 | 2,332,392 | 226,850 |
| Philadelphia, Pa | 1,400 | 159 | 722 | 67 | 720 | 71 |
| Portland and Falmouth, Me | 100 | 13 | | | | |
| St. Johns, Fla | | | 322 | 38 | 1,250 | 155 |
| Gulf ports: | | | | | | |
| Galveston, Tex | 60 | 8 | 40,213 | 3,216 | 292 | 23 |
| Key West, Fla | 890 | 94 | 312 | 25 | 190 | 18 |
| Mobile, Ala | 38,267 | 3,031 | 11,675 | 992 | 10,823 | 1,051 |
| New Orleans, La | 88,014 | 7,775 | 112,850 | 10,217 | 194,711 | 18,144 |
| Sabine, Tex | | | | | 101 | 9 |
| Tampa, Fla | 24 | 2 | | | | |
| Mexican border ports: | | | | | | |
| Arizona | 45,883 | 4,128 | 34,479 | 3,268 | 43,035 | 3,856 |
| Corpus Christi, Tex | | | | | 30,930 | 2,775 |
| Paso del Norte, Tex | 387,568 | 30,336 | 513,202 | 42,548 | 626,837 | 56,147 |
| Saluria, Tex | 21,962 | 1,666 | 22,662 | 1,960 | 22,887 | 2,341 |
| Pacific ports: | | | | | | |
| Alaska | | | 305,294 | 33,315 | 790 | 99 |
| Hawaii | | | | | 144 | 14 |
| Los Angeles, Cal | 840 | 53 | | | | |
| Puget Sound, Wash | 17,286,930 | 1,499,819 | 9,340,000 | 845,982 | 6,351,440 | 528,558 |
| San Diego, Cal | 4,228 | 331 | 8,456 | 661 | 6,994 | 567 |
| San Francisco, Cal | 24,613,868 | 1,969,214 | 12,502,876 | 1,012,199 | 18,601,705 | 1,597,735 |
| Willamette, Oreg | 540 | 55 | 3,723 | 241 | 100 | 22 |

EXPORTS, BY CUSTOMS DISTRICTS, OF CANNED SALMON, 1900 TO 1910—Continued.

| Customs districts from which exported. | 1906 | | 1907 | | 1908 | |
|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| Northern border and Lake ports: | | | | | | |
| Huron, Mich. | 177,734 | $13,107 | 7,000 | $570 | ..... | ..... |
| Minnesota, Minn. | ..... | ..... | 48 | 5 | ..... | ..... |
| Oswegatchie, N. Y. | ..... | ..... | 780 | 71 | 400 | $46 |
| Vermont, Vt. | 35 | 3 | ..... | ..... | ..... | ..... |
| Total | 45,944,414 | 3,847,943 | 25,218,105 | 2,183,049 | 28,226,045 | 2,438,518 |
| RECAPITULATION. | | | | | | |
| Atlantic ports | 3,277,571 | 318,321 | 2,314,535 | 227,779 | 2,334,663 | 227,113 |
| Gulf ports | 127,255 | 10,910 | 165,050 | 14,450 | 206,120 | 19,245 |
| Mexican border ports | 455,413 | 36,130 | 570,343 | 47,776 | 723,689 | 65,119 |
| Pacific ports | 41,906,406 | 3,469,472 | 22,160,349 | 1,892,398 | 24,961,173 | 2,126,995 |
| Northern border and Lake ports | 177,769 | 13,110 | 7,828 | 646 | 400 | 46 |

| Customs districts from which exported. | 1909 | | 1910 | |
|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. |
| Atlantic ports: | | | | |
| Baltimore, Md. | 192 | $22 | 36 | $3 |
| Bangor, Me. | 216 | 25 | ..... | ..... |
| Boston and Charlestown, Mass. | 162,024 | 16,837 | 3,000 | 280 |
| New York, N. Y. | 3,848,870 | 390,266 | 2,999,480 | 305,732 |
| Philadelphia, Pa. | 405 | 44 | 700 | 89 |
| Norfolk and Portsmouth, Va. | 32,100 | 2,739 | ..... | ..... |
| Perth Amboy, N. J. | ..... | ..... | 214 | 18 |
| Gulf ports: | | | | |
| Galveston, Tex. | 876 | 88 | 155 | 12 |
| Key West, Fla. | 40 | 4 | 340 | 27 |
| Mobile, Ala. | 13,565 | 1,247 | 14,018 | 1,322 |
| New Orleans, La. | 92,537 | 7,615 | 103,980 | 8,187 |
| Tampa, Fla. | ..... | ..... | 66 | 6 |
| Mexican border ports: | | | | |
| Arizona | 27,735 | 2,733 | 54,425 | 4,612 |
| Brazos de Santiago, Tex. | 138 | 13 | 641 | 64 |
| Corpus Christi, Tex. | 26,220 | 2,450 | 27,365 | 2,414 |
| Paso del Norte, Tex. | 150,636 | 14,850 | 125,169 | 11,560 |
| Saluria, Tex. | 14,399 | 1,528 | 47,117 | 2,853 |
| Pacific ports: | | | | |
| Alaska | 66,020 | 6,263 | ..... | ..... |
| Los Angeles, Cal. | 13,370 | 934 | 9,229 | 820 |
| Puget Sound, Wash. | 7,858,552 | 716,370 | 32,406,617 | 3,331,174 |
| San Diego, Cal. | 5,546 | 460 | 6,355 | 583 |
| San Francisco, Cal. | 23,761,656 | 2,247,957 | 28,027,911 | 2,641,608 |
| Willamette, Oreg. | ..... | ..... | 78 | 11 |
| Northern border and Lake ports: | | | | |
| Detroit, Mich. | 42,000 | 3,990 | ..... | ..... |
| North and South Dakota | 12 | 1 | ..... | ..... |
| Duluth, Minn. | ..... | ..... | 33,200 | 2,800 |
| Montana and Idaho | ..... | ..... | 600 | 83 |
| Total | 36,117,109 | 3,416,436 | 63,860,696 | 6,314,258 |
| RECAPITULATION. | | | | |
| Atlantic ports | 4,043,807 | 409,933 | 3,003,430 | 306,122 |
| Gulf ports | 107,018 | 8,954 | 118,559 | 9,554 |
| Mexican border ports | 219,128 | 21,574 | 254,717 | 21,503 |
| Pacific ports | 31,705,144 | 2,971,984 | 60,450,190 | 5,974,196 |
| Northern border and Lake ports | 42,012 | 3,991 | 33,800 | 2,883 |

## EXPORTS OF FRESH AND CURED SALMON.

The following table shows, by countries, the value of the exports of fresh and cured salmon for the period 1900 to 1910, inclusive. As with the canned salmon, the greater part of these exports go to European countries, Germany taking by far the largest quantity. A small portion of this is salmon caught in eastern waters.

EXPORTS, BY COUNTRIES RECEIVING, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910.

| Exported to— | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 |
|---|---|---|---|---|---|---|
| North America: | | | | | | |
| Bermuda | $88 | $14 | $11 | $21 | ..... | $246 |
| British Honduras | 7 | 9 | ..... | 22 | $120 | 94 |
| Dominion of Canada— | | | | | | |
| Nova Scotia, New Brunswick, etc. | ..... | ..... | ..... | ..... | 418 | 3 |
| Quebec, Ontario, Manitoba, etc. | 1,516 | 2,555 | 1,051 | 6,083 | 3,572 | 7,499 |
| British Columbia | 80,652 | 53,922 | 125,916 | 53,592 | 25,913 | 10,299 |
| Central American States— | | | | | | |
| Costa Rica | 220 | 703 | 218 | 178 | 340 | 192 |
| Guatemala | ..... | ..... | 27 | 11 | 1 | 208 |
| Honduras | ..... | 5 | ..... | 1 | 2 | 26 |
| Nicaragua | 53 | 26 | 40 | 78 | 40 | 75 |
| Panama | ..... | ..... | ..... | ..... | 167 | 315 |
| Salvador | ..... | 22 | ..... | 7 | ..... | ..... |
| Mexico | 1,330 | 664 | 1,925 | 1,397 | 1,266 | 1,136 |
| West Indies - | | | | | | |
| British | 943 | 939 | 2,348 | 5,150 | 3,867 | 4,999 |
| Cuba | 429 | 376 | 273 | 114 | 194 | 162 |
| Danish | 12 | 31 | 38 | 84 | 13 | 67 |
| Dutch | 195 | 167 | 293 | 177 | 197 | 238 |
| French | 126 | 122 | 315 | 199 | 273 | 100 |
| Haiti | 181 | 191 | 164 | 54 | 11 | 124 |
| Porto Rico | 1,214 | ..... | ..... | ..... | ..... | ..... |
| Santo Domingo | 998 | 670 | 85 | 57 | 14 | 26 |
| South America: | | | | | | |
| Argentina | ..... | ..... | ..... | ..... | 143 | 1,641 |
| Bolivia | ..... | ..... | 1,200 | ..... | ..... | ..... |
| Brazil | 172 | 38 | 419 | 385 | 227 | 1,160 |
| Chile | 142 | ..... | ..... | 70 | 164 | ..... |
| Colombia | 416 | 223 | 657 | 441 | 17 | ..... |
| Ecuador | ..... | ..... | 65 | ..... | ..... | 15 |
| Guiana - | | | | | | |
| British | 30 | 82 | 30 | 262 | 60 | 161 |
| Dutch | 400 | 226 | 286 | 11 | 766 | 176 |
| French | 420 | 290 | 134 | 434 | 251 | 65 |
| Peru | 26 | ..... | 27 | 62 | 194 | 112 |
| Venezuela | 96 | 42 | 245 | 25 | ..... | 108 |
| Europe: | | | | | | |
| Azores, and Madeira Islands | 3 | ..... | ..... | ..... | 123 | 85 |
| Belgium | ..... | 1,062 | 88 | ..... | 4,750 | ..... |
| Denmark | 378 | 15,285 | 16,904 | 653 | 2,315 | 22,952 |
| France | 180 | 300 | ..... | ..... | 57 | ..... |
| Germany | 300,291 | 320,369 | 470,657 | 741,634 | 1,061,944 | 1,666,787 |
| Greece | ..... | ..... | ..... | ..... | ..... | 158 |
| Italy | ..... | ..... | ..... | ..... | ..... | 100 |
| Malta, Gozo, etc | 475 | 55 | 280 | 28 | ..... | ..... |
| Netherlands | 50 | 184 | 3,023 | 4,127 | 3,105 | 300 |
| Norway | ..... | ..... | ..... | 12,765 | 12,295 | 7,896 |
| Russia in Europe | 300 | ..... | ..... | ..... | ..... | 2,574 |
| Spain | ..... | ..... | ..... | ..... | ..... | 56 |
| Sweden and Norway[a] | 7 | 5,595 | 5,685 | ..... | ..... | ..... |
| Sweden | ..... | ..... | ..... | ..... | 1,838 | 17,776 |
| United Kingdom | 38,959 | 1,528 | ..... | 990 | 8,523 | 29,355 |
| Asia: | | | | | | |
| Chinese Empire | ..... | 400 | 25 | 9 | 54 | 201 |
| China—Russian | ..... | ..... | ..... | 15 | ..... | ..... |
| East Indies— | | | | | | |
| British | ..... | 121 | 71 | 30 | 115 | 135 |
| Dutch | ..... | ..... | ..... | ..... | 275 | ..... |
| Hongkong | 507 | ..... | 519 | 1,840 | 462 | 4,797 |
| Japan | 2,807 | 14,516 | 25,228 | 3,499 | 476 | 25,037 |
| Russia—Asiatic | 10 | ..... | ..... | ..... | ..... | ..... |
| Oceania: | | | | | | |
| British Australasia | 39,867 | 618 | 33,785 | 31,503 | 25,208 | 21,595 |
| All other British Oceania | ..... | ..... | 346 | 29 | 27 | 22 |
| French Oceania | 1,958 | 1,729 | 1,325 | 1,877 | 1,838 | 2,299 |
| German Oceania | ..... | ..... | 13 | 948 | 977 | 861 |
| Guam | 57 | 3,420 | ..... | ..... | ..... | ..... |
| Hawaii | 58,870 | ..... | ..... | ..... | ..... | ..... |

[a] Sweden and Norway separated in 1898.

EXPORTS, BY COUNTRIES RECEIVING, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910—Continued.

| Exported to— | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 |
|---|---|---|---|---|---|---|
| Oceania—Continued. | | | | | | |
| Philippine Islands | | | $384 | $478 | $13 | $308 |
| Tonga, Samoa, and all other | $636 | $215 | | | | |
| Tutuila | | | 10 | | | |
| Africa: | | | | | | |
| British Africa— | | | | | | |
| West | | | 304 | | | |
| South | 170 | 24 | 21 | 12 | 859 | 114 |
| French Africa | 85 | | | | | |
| Liberia | | | | | 5 | |
| Total | 535,276 | 426,738 | 694,435 | 869,352 | 1,163,489 | 1,832,655 |
| RECAPITULATION. | | | | | | |
| North America | 87,964 | 60,416 | 132,704 | 67,225 | 36,408 | 25,809 |
| South America | 1,702 | 901 | 3,063 | 1,690 | 1,822 | 3,438 |
| Europe | 340,643 | 344,368 | 496,637 | 760,197 | 1,094,950 | 1,748,039 |
| Asia | 3,324 | 15,037 | 25,843 | 5,393 | 1,382 | 30,170 |
| Oceania | 101,388 | 5,982 | 35,863 | 34,835 | 28,063 | 25,085 |
| Africa | 255 | 24 | 325 | 12 | 864 | 114 |

| Exported to— | 1906 | 1907 | 1908 | 1909 | 1910 |
|---|---|---|---|---|---|
| North America: | | | | | |
| Bermuda | $173 | $20 | $23 | $68 | $630 |
| British Honduras | 14 | | 1,036 | | |
| Dominion of Canada—Nova Scotia, New Brunswick, etc | 32,925 | 18,785 | 16,964 | 21,973 | 23,559 |
| Central American States— | | | | | |
| Costa Rica | 46 | 213 | 189 | 217 | 197 |
| Guatemala | 40 | | 902 | 18 | 62 |
| Honduras | | 92 | 2,451 | | |
| Nicaragua | 39 | 27 | 1,317 | 31 | 11 |
| Panama | 380 | 2,211 | 1,878 | 175 | 775 |
| Mexico | 1,231 | 528 | 460 | 199 | 555 |
| West Indies— | | | | | |
| British | 1,646 | 208 | 975 | 4,890 | 3,067 |
| Cuba | 128 | 371 | 104 | 121 | 97 |
| Danish | 30 | 108 | 39 | 165 | 42 |
| Dutch | 94 | 93 | | 49 | 78 |
| French | | 16 | 19 | 14 | 19 |
| Haiti | 97 | 277 | 678 | 335 | 283 |
| Santo Domingo | 100 | 255 | 228 | 128 | 313 |
| South America: | | | | | |
| Argentina | 85 | 500 | | | |
| Brazil | 308 | | | 120 | 3,029 |
| Chile | 15 | 20 | 56 | | |
| Colombia | 105 | 67 | 90 | 22 | 167 |
| Ecuador | | 391 | | 290 | |
| Guiana— | | | | | |
| British | 218 | 5 | 48 | 76 | 823 |
| Dutch | 287 | 133 | 130 | 271 | 217 |
| French | 57 | 36 | 75 | 21 | 695 |
| Peru | 1,317 | 1,163 | 118 | 555 | |
| Venezuela | 208 | 36 | | | 311 |
| Uruguay | | | | 10 | |
| Europe: | | | | | |
| Azores, and Madeira Islands | | 95 | | | |
| Belgium | 114 | | | 410 | |
| Denmark | 36,623 | 108,269 | 90,015 | 81,195 | 83,580 |
| France | | 150 | | 250 | 215 |
| Germany | 1,670,366 | 1,601,166 | 1,422,846 | 1,038,530 | 1,223,595 |
| Italy | 137 | | | | |
| Netherlands | 793 | 264 | 2,947 | | |
| Norway | 9,303 | 11,390 | 22,104 | 22,917 | 45,885 |
| Portugal | | 1,650 | | | |
| Russia in Europe | | 140 | | 14,735 | 5,260 |
| Spain | | 55 | | 289 | |
| Sweden | 32,554 | 23,469 | 21,540 | 23,670 | 42,725 |
| United Kingdom | 26,196 | 48,237 | 28,083 | 43,952 | 66,555 |
| Asia: | | | | | |
| Chinese Empire | 3,391 | 293 | 170 | 41 | 89 |
| East Indies— | | | | | |
| British | 63 | | 66 | 18 | 60 |
| Dutch | | | | | 41 |
| Hongkong | 1,339 | 687 | 13 | 809 | 10 |
| Japan | 88,068 | 18,395 | 3,592 | 2,772 | 90 |
| Korea | | 3 | | | 3 |
| Philippine Islands | | 6 | 121 | | |
| Turkey in Asia | | | | | 55 |

EXPORTS, BY COUNTRIES RECEIVING, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910—Continued.

| Exported to— | 1906 | 1907 | 1908 | 1909 | 1910 |
|---|---|---|---|---|---|
| Oceania: | | | | | |
| British Australasia | $15,169 | $23,186 | $26,591 | $25,466 | $22,826 |
| All other British Oceania | 21 | | 11 | | 89 |
| French Oceania | 2,154 | 2,136 | 1,792 | 1,528 | 1,886 |
| German Oceania | 749 | 1,112 | 373 | 1,229 | 1,189 |
| Philippine Islands | 821 | 12,287 | | 712 | 2,089 |
| Africa: | | | | | |
| British Africa—South | 20 | | | | 1,268 |
| Liberia | 40 | | | | |
| Portuguese Africa | | | 198 | | |
| Spanish Africa | | | | 289 | |
| Total | 1,927,464 | 1,878,743 | 1,648,044 | 1,288,560 | 1,532,640 |
| RECAPITULATION. | | | | | |
| North America | 36,943 | 23,204 | 27,263 | 28,383 | 29,688 |
| South America | 2,600 | 2,351 | 517 | 1,365 | 5,242 |
| Europe | 1,776,086 | 1,794,885 | 1,587,535 | 1,225,948 | 1,468,015 |
| Asia | 92,861 | 19,384 | 3,962 | 3,640 | 348 |
| Oceania | 18,914 | 38,721 | 28,767 | 28,935 | 28,079 |
| Africa | 60 | 198 | | 289 | 1,268 |

The exports of domestic fresh and cured salmon from 1900 to 1910, inclusive, are shown below, by customs districts. The greater part of the shipments pass through the New York City customs district:

EXPORTS, BY CUSTOMS DISTRICTS, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910.

| Customs districts from which exported. | 1900 | 1901 | 1902 | 1903 | 1904 | 1905 |
|---|---|---|---|---|---|---|
| Atlantic ports: | | | | | | |
| Baltimore, Md | | | $158 | | | $8 |
| Bangor, Me | | | | | | 3 |
| Belfast, Me | $12 | $17 | 12 | $19 | $7 | |
| Boston and Charlestown, Mass | 16 | | 34 | 52 | 418 | |
| New York, N. Y | 346,853 | 330,805 | 503,219 | 766,128 | 1,102,542 | 1,757,742 |
| Philadelphia, Pa | 10 | | | 1,151 | 7 | |
| Portland and Falmouth, Me | 11 | 68 | 16 | 47 | 60 | 79 |
| Savannah, Ga | 22 | | | | | |
| Gulf ports: | | | | | | |
| Mobile, Ala | | | | 30 | 8 | 96 |
| New Orleans, La | | 5 | 143 | | 116 | 63 |
| Mexican border ports: | | | | | | |
| Arizona | 18 | 85 | 416 | 115 | | 14 |
| Brazos de Santiago, Tex | | | | 19 | 4 | |
| Corpus Christi, Tex | 414 | 13 | | 30 | 208 | |
| Paso del Norte, Tex | 760 | 67 | 13 | | 80 | 206 |
| Saluria, Tex | | 370 | 1,428 | 1,063 | 868 | 777 |
| Pacific ports: | | | | | | |
| Alaska | 2,377 | 12,422 | 293 | 4,375 | 1,003 | 1,184 |
| Oregon, Oreg | | 17,500 | | | | |
| Puget Sound, Wash | 80,493 | 55,727 | 150,906 | 58,278 | 29,212 | 36,145 |
| San Diego, Cal | 108 | 19 | 20 | 34 | 73 | 4 |
| San Francisco, Cal | 102,666 | 7,030 | 36,958 | 36,331 | 25,851 | 27,939 |
| Willamette, Oreg | | | | | 28 | 1,500 |
| Northern border and Lake ports: | | | | | | |
| Champlain, N. Y | 234 | 1,464 | 449 | 1,542 | 1,183 | 2,142 |
| Detroit, Mich | | 742 | 24 | | 1,393 | 4,445 |
| Genesee, N. Y | | | | | 26 | |
| Huron, Mich | 456 | 121 | 225 | 55 | | |
| Memphremagog, Vt | | | 6 | 7 | 24 | |
| Montana and Idaho | 2 | 6 | | | | 6 |
| North and South Dakota | 523 | 162 | 95 | 36 | 378 | 247 |
| Superior, Mich | | | | | | 33 |
| Vermont, Vt | 301 | 115 | 20 | 40 | | 22 |
| Total | 535,276 | 426,738 | 694,435 | 869,352 | 1,163,489 | 1,832,655 |
| RECAPITULATION. | | | | | | |
| Atlantic ports | 346,924 | 330,890 | 503,439 | 767,397 | 1,103,034 | 1,757,832 |
| Gulf ports | | 5 | 143 | 30 | 124 | 159 |
| Mexican border ports | 1,192 | 535 | 1,857 | 1,227 | 1,160 | 997 |
| Pacific ports | 185,644 | 92,698 | 188,177 | 99,018 | 56,167 | 66,772 |
| Northern border and Lake ports | 1,516 | 2,610 | 819 | 1,680 | 3,004 | 6,895 |

EXPORTS, BY CUSTOMS DISTRICTS, OF DOMESTIC PICKLED, FRESH, ETC., SALMON, 1900 TO 1910—Continued.

| Customs districts from which exported. | 1906 | 1907 | 1908 | 1909 | 1910 |
|---|---|---|---|---|---|
| Atlantic ports: | | | | | |
| Baltimore, Md | $11 | | | $31 | |
| Bangor, Me | | | $7 | 58 | |
| Belfast, Me | 15 | $8 | | 11 | $12 |
| New York, N. Y | 1,781,330 | 1,786,105 | 1,590,757 | 1,230,436 | 1,479,625 |
| Philadelphia, Pa | 105 | | | | |
| Portland and Falmouth, Me | 15 | 11,298 | 14 | 6 | 19 |
| Gulf ports: | | | | | |
| Mobile, Ala | 14 | | 128 | | |
| New Orleans, La | | 276 | 7,098 | 49 | 74 |
| Mexican border ports: | | | | | |
| Arizona | 700 | 134 | 13 | 25 | |
| Brazos de Santiago, Tex | | | | | 5 |
| Paso del Norte, Tex | 8 | 290 | 154 | | |
| Saluria, Tex | 80 | | | | 197 |
| Pacific ports: | | | | | |
| Alaska | 44,436 | 451 | 803 | 1,091 | 212 |
| Puget Sound, Wash | 63,626 | 44,492 | 14,370 | 11,677 | 22,666 |
| San Diego, Cal | 44 | | 28 | 4 | 12 |
| San Francisco, Cal | 31,500 | 28,984 | 29,112 | 37,305 | 27,628 |
| Willamette, Oreg | | | | 743 | 3 |
| Hawaii | | | | 14 | |
| Northern border and Lake ports: | | | | | |
| Buffalo Creek, N. Y | | | | 3,069 | |
| Cape Vincent, N. Y | | 92 | | | |
| Champlain, N. Y | 992 | 4,333 | 1,359 | 2,079 | 598 |
| Detroit, Mich | 3,954 | 1,972 | 1,667 | | |
| Duluth, Minn | | | | | 68 |
| Huron, Mich | 428 | | 284 | 891 | |
| Memphremagog, Vt | | | | | 20 |
| Minnesota, Minn | 40 | 52 | 798 | 59 | |
| Montana and Idaho | 69 | 92 | 45 | 154 | 82 |
| North and South Dakota | 36 | 3 | 20 | | |
| Vermont, Vt | 61 | 161 | 1,387 | 858 | 1,419 |
| Total | 1,927,464 | 1,878,743 | 1,648,044 | 1,288,560 | 1,532,640 |
| RECAPITULATION. | | | | | |
| Atlantic ports | 1,781,476 | 1,797,411 | 1,590,778 | 1,230,542 | 1,479,656 |
| Gulf ports | 14 | 276 | 7,226 | 49 | 74 |
| Mexican border ports | 788 | 424 | 167 | 25 | 202 |
| Pacific ports | 139,606 | 73,927 | 44,313 | 50,834 | 50,521 |
| Northern border and Lake ports | 5,580 | 6,705 | 5,560 | 7,110 | 2,187 |

## IMPORTS OF FRESH SALMON.

For some years it was the custom of the canneries on Puget Sound, when fish were scarce on the American side and abundant on the Canadian side, to import fresh salmon to fill out the domestic supply, and the Canadian canneries would do the same when the conditions were reversed. In 1904 the Canadian Government prohibited the export of fresh salmon to Puget Sound for packing purposes, and in 1910 an effort was made to have Congress retaliate by enacting a similar law for this side of the line, but the bill failed of passage. The reciprocity agreement with Canada now before Congress provides for the free entry of fresh fish and would permit the canneries of either country to import salmon as they wished. This agreement, if adopted, will undoubtedly be of considerable importance to the Puget Sound canneries in securing full packs in certain poor years.

The table below shows the yearly imports of fresh salmon from British Columbia:

IMPORTS OF FRESH SALMON FROM BRITISH COLUMBIA, CANADA, FOR A SERIES OF YEARS.

| Year. | Pounds. | Value. | Year. | Pounds. | Value. | Year. | Pounds. | Value. |
|---|---|---|---|---|---|---|---|---|
| 1890 | 4,660 | $241 | 1897 | 93,454 | $2,681 | 1904 | 40,610 | $1,025 |
| 1891 | 4,950 | 170 | 1898 | 11,580 | 278 | 1905 | 1,015 | 35 |
| 1892 | 6,288 | 301 | 1899 | 58,002 | 4,101 | 1906 | 3,457,738 | 64,408 |
| 1893 | 64,811 | 3,639 | 1900 | 19,404 | 855 | 1907 | 113,224 | 4,131 |
| 1894 | 3,872 | 219 | 1901 | 27,072 | 2,050 | 1908 | 8,880 | 795 |
| 1895 | 14,000 | 1,403 | 1902 | 22,353 | 739 | 1909 | 41,073 | 2,346 |
| 1896 | 11,799 | 419 | 1903 | 6,860 | 343 | 1910 | 198,251 | 10,116 |

## IMPORTS OF CURED SALMON.

Below are shown the imports into this country of foreign-cured salmon, the product of the Pacific salmon fisheries, from 1886 to 1909, inclusive.

IMPORTS OF FOREIGN PICKLED PACIFIC SALMON, 1886 TO 1909.

| Year. | British Columbia. | | Japan. | | Hongkong. | | Russia, Asiatic. | | Total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. | Pounds. | Value. |
| 1886 | 5,600 | $224 | | | | | | | 5,600 | $224 |
| 1887 | 200 | 4 | | | | | | | 200 | 4 |
| 1888 | 86,000 | 4,031 | | | | | | | 86,000 | 4,031 |
| 1889 | 18,200 | 860 | | | | | | | 18,200 | 860 |
| 1890 | 600 | 36 | | | | | | | 600 | 36 |
| 1891 | 200 | 5 | | | | | | | 200 | 5 |
| 1892 | | | | | | | | | | |
| 1893 | 5,478 | 291 | | | | | | | 5,478 | 291 |
| 1894 | 149,410 | 17,592 | | | 1,200 | $29 | 11,875 | $298 | 162,485 | 17,919 |
| 1895 | 6,550 | 250 | | | 600 | 13 | | | 7,150 | 263 |
| 1896 | 6,530 | 474 | | | | | | | 6,530 | 474 |
| 1897 | 6,890 | 156 | | | | | | | 6,890 | 156 |
| 1898 | 4,145 | 188 | | | 30 | 2 | 9,870 | 266 | 14,045 | 456 |
| 1899 | 15,875 | 1,554 | | | | | | | [a] 16,032 | [a] 1,560 |
| 1900 | 162,558 | 11,061 | 600 | $41 | | | | | 163,158 | 11,102 |
| 1901 | 165,243 | 11,225 | | | | | | | 165,243 | 11,225 |
| 1902 | 175,411 | 13,794 | 606 | 28 | | | | | 176,017 | 13,822 |
| 1903 | 161,549 | 11,756 | 360 | 18 | | | | | 161,909 | 11,774 |
| 1904 | 282,210 | 23,319 | 1,400 | 52 | | | | | 283,610 | 23,371 |
| 1905 | 282,027 | 25,584 | 3,015 | 133 | | | | | 285,042 | 25,717 |
| 1906 | 35,475 | 1,730 | 5,510 | 175 | | | | | 40,985 | 1,905 |
| 1907 | 6,393 | 322 | 680 | 31 | | | | | 7,073 | 353 |
| 1908 | 13,230 | 631 | 4,185 | 174 | | | | | 17,415 | 805 |
| 1909 | 30,710 | 1,523 | 3,537 | 148 | | | | | 34,247 | 1,617 |
| 1910 | 111,645 | 5,505 | | | | | | | | |

[a] Includes 157 pounds, valued at $6, from China.

## XI. SALMON CULTURE.

### CALIFORNIA.

#### HISTORY.

The first fish-cultural station on the Pacific coast was located on McCloud River, a stream of the Sierra Nevada Mountains emptying into Pitt River, a tributary to the Sacramento, 323 miles nearly due north of San Francisco. The site on the west bank of the river, about 3 miles above the mouth, was chosen after investigation of a number of places on the Sacramento, by Mr. Livingston Stone, one of America's pioneer fish culturists, and the station was named Baird, in honor of the then Commissioner of Fisheries, Prof. Spencer F. Baird. Although the season had nearly passed when the station was sufficiently advanced to handle eggs, 50,000 eggs were secured, and while 20,000 were lost, owing to the excessive heat, the remaining 30,000 were shipped east, all of which were eventually lost but 7,000 fry, which were planted in the Susquehanna River, in Pennsylvania.

The main object of the hatchery the first few years was to secure eggs to ship to the East for the purpose of introducing Pacific salmon in the waters in that section. The Commission early made an agreement with the State of California, however, under which the latter at first paid part of the expense, and the Commission hatched and planted a portion of the take in the McCloud River. Later, part of the eggs were turned over to the State, which hatched and planted the salmon in local waters.

In 1881 the station buildings were washed away in a freshet, but were immediately rebuilt. From 1884 to 1887, both inclusive, all operations were suspended.

In 1889 a hatchery was established at Fort Gaston, on the Army reservation in the Hoopa Indian Reservation in Humboldt County, but it was not put into operation until 1890. As the reservation was abolished on July 1, 1892, the Commission took complete charge of the plant, and in 1893 established a tributary station on Redwood Creek. The same year Korbel station was established about one-half mile above Korbel, on Mad River, in Humboldt County. Owing to the lack of money this station was closed in the fiscal year 1896, but was reopened during the fiscal year 1897.

That same year the Commission erected, on ground owned by the State, a hatchery at Battle Creek, in Tehama County, and also took charge of and operated the hatchery erected at this place by the State fish commission the previous year. Under the terms of an

agreement the Commission was to deliver to the State as many eyed spawn as the latter could hatch at Sisson, its own station.

Owing to their inaccessibility, the Fort Gaston hatchery and its substations were abandoned in 1898. The same year an experimental station was established at Olema, Bear Valley, in Marin County, whence eggs were transferred from Baird station, hatched out here, and planted in Olema Creek in order to see if they could not be domesticated here, where they had not been found previously.

During the fiscal year 1902 a substation was established on Mill Creek, a stream which has its source in the foothills of the Sierra Mountains, in the northeastern part of Tehama County, and empties into the Sacramento River from the east about a mile above the town of Tehama. The eggs are retained here until eyed and then shipped to other hatcheries.

As stated above, the State aided the work of the United States Fish Commission in a financial way and also by hatching and distributing the eggs turned over to its care. In 1885 the State legislature passed a bill authorizing the establishment of a hatchery of its own, and the same year such a station was built upon Hat Creek about 2½ miles above its junction with Pitt River, a tributary of the Sacramento River. As the work of the first few seasons developed that the location was unsuitable, the hatchery was removed in 1888 to Sisson, in Siskiyou County. The work of this hatchery was to handle the eggs turned over to it by the United States Fish Commission.

In 1895 another hatchery was built by the State near the mouth of Battle Creek, a tributary of the Sacramento River. In 1896 and 1897 this hatchery was operated jointly by the State and the United States Fish Commission while awaiting the appropriation of money by the Commission to purchase it from the State.

In the fall of 1897 a hatchery was established by the State on Price Creek, a tributary of Eel River, in Humboldt County, and in 1902 this hatchery made the first plant in the State of steelhead trout fry.

Santa Cruz County has had a hatchery at Brookdale for a number of years.

## OUTPUT.

The following tables show separately the quantity of eggs, fry, etc., distributed by the United States Fish Commission and the State since the inception of the work. The large quantity of eggs shown by the Commission represents largely the eggs supplied to the State, which hatched and distributed them, and eggs sent to other States and to foreign countries.

## Output of Hatcheries Owned by the United States Bureau of Fisheries.

| Year ending June 30[a]— | Chinook. | | Silver fry. | Steelhead trout. | | Total. | |
|---|---|---|---|---|---|---|---|
| | Eggs. | Fry. | | Eggs. | Fry. | Eggs. | Fry. |
| 1872 | 30,000 | | | | | 30,000 | |
| 1873 | 1,400,000 | | | | | 1,400,000 | |
| 1874 | 4,155,000 | 850,000 | | | | 4,155,000 | 850,000 |
| 1875 | 6,250,000 | 1,750,000 | | | | 6,250,000 | 1,750,000 |
| 1876 | 5,065,000 | 1,500,000 | | | | 5,065,000 | 1,500,000 |
| 1877 | 4,983,000 | 2,000,000 | | | | 4,983,000 | 2,000,000 |
| 1878 | 7,810,000 | 2,500,000 | | | | 7,810,000 | 2,500,000 |
| 1879 | 4,250,000 | 2,300,000 | | | | 4,250,000 | 2,300,000 |
| 1880 | 3,800,000 | 2,000,000 | | | | 3,800,000 | 2,000,000 |
| 1881 | 4,300,000 | 3,100,000 | | | | 4,300,000 | 3,100,000 |
| 1882 | | 3,991,750 | | | | | 3,991,750 |
| 1883 | | 776,125 | | | | | 776,125 |
| 1889[b] | 3,450,000 | 1,500,000 | | | | 3,450,000 | 1,500,000 |
| 1890 | 1,554,000 | 84,000 | | | | 1,554,000 | 84,000 |
| 1891 | 2,988,000 | 777,000 | | | | 2,988,000 | 777,000 |
| 1892 | 2,902,000 | 315,500 | | | | 2,902,000 | 315,500 |
| 1893 | 3,530,000 | 1,190,100 | | | | 3,530,000 | 1,190,100 |
| 1894 | 7,500,000 | 438,500 | 280,000 | 75,000 | 308,500 | 7,575,000 | 1,027,000 |
| 1895 | 3,676,000 | 500,000 | [c]1,250,000 | | [d]1,184,500 | 3,676,000 | 2,934,500 |
| 1896 | 6,170,800 | 715,700 | | 175,000 | 107,808 | 6,345,800 | 823,508 |
| 1897 | 18,232,590 | 3,056,701 | 298,137 | 50,000 | 257,000 | 18,282,590 | 3,611,838 |
| 1898 | 30,605,000 | 15,643,300 | | 60,000 | 650,000 | 30,665,000 | 16,293,300 |
| 1899 | 27,665,000 | 3,275,110 | | | | 27,665,000 | 3,275,110 |
| 1900 | 2,925,000 | 3,533,950 | | | | 2,925,000 | 3,533,950 |
| 1901 | 3,934,036 | 889,570 | | | | 3,934,036 | 889,570 |
| 1902 | 17,580,410 | 2,115,560 | | | | 17,580,410 | 2,115,560 |
| 1903 | 11,275,777 | 1,618,066 | | | | 11,275,777 | 1,618,066 |
| 1904 | 64,598,354 | 2,350,130 | | | | 64,598,354 | 2,350,130 |
| 1905 | 96,025,765 | 7,561,380 | | | | 96,025,765 | 7,561,380 |
| 1906 | 107,905,945 | [e]3,496,405 | | | | 107,905,945 | 3,496,405 |
| 1907 | 73,376,315 | 2,512,250 | | | | 73,376,315 | 2,512,250 |
| 1908 | 64,990,550 | 4,780,855 | | | | 64,990,550 | 4,780,855 |
| 1909 | 32,278,265 | 3,590,078 | | | | 32,278,265 | 3,590,078 |
| 1910 | 30,539,467 | 2,286,257 | | | | 30,539,467 | 2,286,257 |
| Total | 655,746,274 | 82,998,287 | 1,828,137 | 360,000 | 2,507,808 | 656,106,274 | 87,334,232 |

[a] The calendar year was used up to 1889.
[b] The hatchery was closed from 1884 to 1888.
[c] Includes 560,000 fingerlings, yearlings, or adults.
[d] Includes 332,000 fingerlings, yearlings, or adults.
[e] Includes 138 fingerlings, yearlings, or adults.

## Output of Hatcheries Owned by the State of California.

| Year. | Chinook. | | Steelhead fry. | Total. | |
|---|---|---|---|---|---|
| | Eggs. | Fry.[a] | | Eggs. | Fry. |
| 1873 | | 520,000 | | | 520,000 |
| 1874 | | 850,000 | | | 850,000 |
| 1875 | [b]250,000 | 2,250,000 | | 250,000 | 2,250,000 |
| 1876 | | 2,000,000 | | | 2,000,000 |
| 1877 | | 2,200,000 | | | 2,200,000 |
| 1878 | | 2,500,000 | | | 2,500,000 |
| 1879 | | 2,300,000 | | | 2,300,000 |
| 1880 | | 2,225,000 | | | 2,225,000 |
| 1881 | | 2,420,000 | | | 2,420,000 |
| 1882 | | 3,991,750 | | | 3,991,750 |
| 1884 | | 600,000 | | | 600,000 |
| 1886 | | 150,000 | | | 150,000 |
| 1887 | | 200,000 | | | 200,000 |
| 1888 | | 1,290,000 | | | 1,290,000 |
| 1889 | | 2,168,000 | | | 2,168,000 |
| 1890 | | 1,320,000 | | | 1,320,000 |
| 1891 | | 2,798,000 | | | 2,798,000 |
| 1892 | | 2,651,000 | | | 2,651,000 |
| 1893 | | 3,941,650 | | | 3,941,650 |

[a] The greater part of the output of chinook fry was from eggs supplied by the United States Bureau of Fisheries hatcheries in California.
[b] All were lost.

OUTPUT OF HATCHERIES OWNED BY THE STATE OF CALIFORNIA—Continued.

| Year. | Chinook. | | Steelhead fry. | Total. | |
|---|---|---|---|---|---|
| | Eggs. | Fry. | | Eggs. | Fry. |
| 1894 | | 7,776,400 | | | 7,776,400 |
| 1895 | | 3,435,000 | | | 3,435,000 |
| 1896 | | 15,283,183 | | | 15,283,183 |
| 1897 | | 18,123,000 | | | 18,123,000 |
| 1898 | | 31,476,388 | | | 31,476,388 |
| 1899 | | 21,234,000 | | | 21,234,000 |
| 1900 | | 2,536,000 | | | 2,536,000 |
| 1901 | | 3,239,000 | | | 3,239,000 |
| 1902 | | 16,852,040 | 301,000 | | 17,153,040 |
| 1903 | | 20,040,487 | 120,000 | | 20,160,487 |
| 1904 | | 63,632,000 | 90,000 | | 63,722,000 |
| 1905 | | 87,000,000 | 108,000 | | 87,108,000 |
| 1906 | | 105,815,920 | 243,000 | | 106,058,920 |
| 1907 | | 71,267,000 | 352,000 | | 71,619,000 |
| 1908 | | 60,619,000 | 170,000 | | 60,789,000 |
| 1909 | | 28,000,000 | 517,000 | | 28,517,000 |
| 1910 | | 28,469,745 | 667,800 | | 29,137,545 |
| Total | 250,000 | 621,174,563 | 2,568,800 | 250,000 | 623,743,363 |

## DISTRIBUTION.

The following table shows, by streams and species, the distribution in California of the eggs, fry, etc., from the hatcheries of the United States Fish Commission and the State. This far from represents the work of the hatcheries, as large quantities of eggs were sent to other States and foreign countries.

DISTRIBUTION OF SALMON EGGS, FRY, ETC., IN THE WATERS OF CALIFORNIA.

| Year. | Klamath River and tributaries. | | | | Redwood Creek and tributaries. | | | |
|---|---|---|---|---|---|---|---|---|
| | Chinook. | | Silver. | | Chinook. | Silver. | | Steelhead. |
| | Fry. | Yearlings. | Fry. | Adults and yearlings. | Fry. | Fry. | Adults and yearlings. | Fry. |
| 1890 | 90,000 | | | | | | | |
| 1891 | 30,000 | | | | 25,000 | | | |
| 1892 | 147,600 | 25,000 | | | 142,500 | | | |
| 1893 | 487,200 | | | | 170,000 | | | |
| 1895 | | | 300,000 | 160,000 | | 140,000 | 400,000 | |
| 1896 | | | | | 65,700 | | | 107,808 |
| 1897 | | | | | 280,250 | 124,750 | | 202,000 |
| 1898 | 16,000 | | | | 1,260,000 | | | 650,000 |
| 1903 | 40,000 | | | | | | | |
| Total | 810,800 | 25,000 | 300,000 | 160,000 | 1,943,450 | 264,750 | 400,000 | 959,808 |

DISTRIBUTION OF SALMON EGGS, FRY, ETC., IN THE WATERS OF CALIFORNIA—Con.

| Year. | Mad River and North Fork. | | | Eel River. | | Russian River. | Skaggs Springs. | Marin County creeks. |
|---|---|---|---|---|---|---|---|---|
| | Chinook. | Silver. | Steelhead. | Chinook. | Steelhead. | Chinook. | Chinook. | Chinook. |
| | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. |
| 1881 | | | | | | 15,000 | 15,000 | |
| 1884 | | 280,000 | 308,500 | | | | | |
| 1885 | | 470,000 | | | | | | |
| 1897 | 145,365 | 173,387 | 60,000 | | | | | 635,000 |
| 1898 | | | | 7,857,388 | | | | 1,970,000 |
| 1899 | | | | 8,202,000 | | | | 900,000 |
| 1900 | | | | 885,000 | | | | |
| 1902 | | | | 2,069,500 | 301,000 | | | |
| 1903 | | | | 5,257,947 | 120,000 | | | |
| 1904 | | | | 5,200,000 | 90,000 | | | |
| 1905 | | | | 8,100,000 | | | | |
| 1906 | | | | 9,265,320 | 243,000 | | | |
| 1907 | | | | 7,570,000 | 352,000 | 25,000 | | 25,000 |
| 1908 | | | | 6,454,000 | | | | |
| 1909 | | | | 5,500,000 | 349,000 | | | |
| Total | 145,365 | 923,387 | 368,500 | 66,061,755 | 1,455,000 | 40,000 | 15,000 | 3,530,000 |

| Year. | Sacramento River and tributaries. | | | | San Francisco Bay streams | San Gregorio River. | Pescadero Creek. | Monterey Bay and tributaries. |
|---|---|---|---|---|---|---|---|---|
| | Chinook. | | | Steelhead. | Chinook. | Chinook. | Chinook. | Chinook. |
| | Eggs. | Fry. | Yearlings, fingerlings, and adults. | Fry. | Fry. | Fry. | Fry. | Fry. |
| 1873 | 20,000 | 520,000 | | | | | | |
| 1874 | | 850,000 | | | | | | |
| 1875 | [a]250,000 | 2,000,000 | | | | | | |
| 1876 | | 2,000,000 | | | | | | |
| 1877 | | 2,200,000 | | | | | | |
| 1878 | | 2,500,000 | | | | | | |
| 1879 | | 2,300,000 | | | | | | |
| 1880 | | 2,225,000 | | | | | | |
| 1881 | | 2,300,500 | | | 20,000 | 15,000 | 15,000 | 30,000 |
| 1882 | 80,300 | 3,991,750 | | | | | | |
| 1884 | | 600,000 | | | | | | |
| 1886 | | 150,000 | | | | | | |
| 1887 | | 200,000 | | | | | | |
| 1888 | | 1,290,000 | | | | | | |
| 1889 | | 3,668,000 | | | | | | |
| 1890 | | 1,404,000 | | | | | | |
| 1891 | | 3,520,000 | | | | | | |
| 1892 | | 2,676,500 | | | | | | |
| 1893 | | 4,474,750 | | | | | | |
| 1894 | | 8,214,900 | | 45,000 | | | | |
| 1895 | | 3,935,000 | | | | | | |
| 1896 | | 15,683,183 | 250,000 | | | | | |
| 1897 | | 19,264,086 | | | | | | |
| 1898 | | 33,998,300 | | | | | | |
| 1899 | 85,200 | 16,307,110 | | | | | | |
| 1900 | | 5,184,950 | | | | | | |
| 1901 | | 4,128,570 | | | | | | |
| 1902 | | 16,898,100 | | | | | | |
| 1903 | | 16,359,605 | | | | | | |
| 1904 | | 60,782,130 | | | | | | |
| 1905 | | 94,561,380 | | 108,000 | | | | |
| 1906 | | 100,038,552 | | | | | | 900,000 |
| 1907 | | 66,209,250 | | 135,000 | | | | 1,200,000 |
| 1908 | | 59,245,855 | | 170,000 | | | | 800,000 |
| 1909 | | 26,090,000 | | 168,000 | | | | |
| Total | 435,500 | 585,771,472 | 250,000 | 626,000 | 20,000 | 15,000 | 15,000 | 2,930,000 |

[a] All were lost.

DISTRIBUTION OF SALMON EGGS, FRY, ETC., IN THE WATERS OF CALIFORNIA—Con.

| Year. | Monterey Bay and tributaries. | | Truckee River. | Total. | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Silver. | Steelhead. | Chinook. | Chinook. | | | Silver. | | Steelhead. |
| | Fry. | Fry. | Fry. | Eggs. | Fry. | Yearlings, fingerlings, and adults. | Fry. | Adults and yearlings. | Fry. |
| 1873 | | | | 20,000 | 520,000 | | | | |
| 1874 | | | | | 850,000 | | | | |
| 1875 | | | 250,000 | 250,000 | 2,250,000 | | | | |
| 1876 | | | | | 2,000,000 | | | | |
| 1877 | | | | | 2,200,000 | | | | |
| 1878 | | | | | 2,500,000 | | | | |
| 1879 | | | | | 2,300,000 | | | | |
| 1880 | | | | | 2,225,000 | | | | |
| 1881 | | | 10,000 | | 2,420,500 | | | | |
| 1882 | | | | 80,300 | 3,991,750 | | | | |
| 1884 | | | | | 600,000 | | | | |
| 1886 | | | | | 150,000 | | | | |
| 1887 | | | | | 200,000 | | | | |
| 1888 | | | | | 1,290,000 | | | | |
| 1889 | | | | | 3,668,000 | | | | |
| 1890 | | | | | 1,494,000 | | | | |
| 1891 | | | | | 3,575,000 | | | | |
| 1892 | | | | | 2,966,600 | 25,000 | | | |
| 1893 | | | | | 5,131,950 | | | | |
| 1894 | | | | | 8,214,900 | | 280,000 | | 353,500 |
| 1895 | | | | | 3,935,000 | | 910,000 | 560,000 | |
| 1896 | | | | | 15,748,883 | 250,000 | | | 107,808 |
| 1897 | | | | | 20,324,701 | | 298,137 | | 262,000 |
| 1898 | | | | | 45,101,688 | | | | 650,000 |
| 1899 | | | | 85,200 | 25,409,110 | | | | |
| 1900 | | | | | 6,072,950 | | | | |
| 1901 | | | | | 4,128,570 | | | | |
| 1902 | | | | | 18,967,600 | | | | 301,000 |
| 1903 | | | | | 5,297,947 | | | | 120,000 |
| 1904 | | | | | 65,982,130 | | | | 90,000 |
| 1905 | | | | | 102,661,380 | | | | 108,000 |
| 1906 | | | | | 110,204,472 | | | | 243,000 |
| 1907 | 80,000 | | | | 75,029,250 | | 80,000 | | 487,000 |
| 1908 | 80,000 | | | | 66,199,855 | | 80,000 | | 170,000 |
| 1909 | 42,000 | 1,200 | | | 31,590,000 | | 42,000 | | 518,200 |
| Total | 202,000 | 1,200 | 260,000 | 435,500 | 645,201,236 | 275,000 | 1,690,137 | 560,000 | 3,410,508 |

## OREGON.

### HATCHERIES ON COASTAL STREAMS.

*Rogue River.*—In 1877 Mr. R. D. Hume, who had been packing salmon on this river for some years, erected a hatchery at Ellensburgh. In 1888 the Oregon Legislature appropriated a sum of money for the enlargement and support of this hatchery, Mr. Hume to retain complete control. As the location is on tidewater it is necessary to catch the parent fish and hold them until they are ready to spawn, and in order to do this Mr. Hume had an excavation 32 by 62 feet and 11 feet deep made in the bank of the river. This was lined with concrete 1 foot thick, which, when filled with water, made a pond 30 by 60 feet and 10 feet deep. Over the entire pond he constructed a building which could be closed up so as virtually to

exclude the light. It is supposed that retaining the fish in a dark place aids in keeping them in good physical condition until ready to spawn. The death of Mr. Hume in 1908 may lead to the abandonment of this hatchery, unless the State or Government takes it over.

In 1897 Mr. Hume built and equipped a hatchery on the upper Rogue River at the mouth of Elk Creek, about 26 miles from the town of Central Point, in Jackson County, and, in pursuance of an understanding with the United States Fish Commission, the latter operated then and still continues to operate this plant.

In 1900 the Government established an auxiliary station for the collection of steelhead trout eggs on Elk Creek, about 10 miles above the main station. In 1905 a substation was operated at Grants Pass, while during the fiscal year 1908 substations were operated at Findley Eddy, on the Rogue River, Illinois River, and Applegate Creek, tributaries of the Rogue.

Many of the eggs gathered at the upper Rogue River stations were shipped to Mr. Hume's hatchery, on the lower river, and there hatched out and planted.

*Coquille River.*—The State formerly had a hatchery on this river, but it was abandoned during the winter of 1902–3. In the winter of 1904–5 a substation was established on one of the tributaries of the Coquille River, about 6 miles from the South Coos River hatchery, and was used in hatching eggs brought to it from the latter place.

*Coos River.*—A hatchery was built by the State in 1900 on the South Coos River, about 20 miles from the town of Marshfield.

*Umpqua River.*—In 1900 the State built a hatchery on the north fork of the Umpqua River, near the town of Glide and about 24 miles east of Roseburg. In 1901 a station was established farther up the north fork, at the mouth of Steamboat Creek. After working here two years the station was moved a couple of miles farther up the stream. In 1907 work was resumed again at the original station near Glide, as winter freshets had seriously damaged the upper station.

*Siuslaw River.*—In 1893 the State erected a hatchery on Knowles Creek, a tributary of the Siuslaw River, about 20 miles above the mouth of the river. It was turned over to the United States Fish Commission to operate, but no fish came up to the hatchery because the fishermen lower down stretched their nets entirely across the river.

In 1897 and 1898 the United States Fish Commission operated a hatchery owned by a Mr. McGuire and located close to Mapleton, about 2 miles below the head of tidewater.

In 1902 the State established an experimental station at the Bailey place, near Meadow post office. In 1907 a permanent station was established by the State on Land Creek fork of the Siuslaw River.

*Alsea River.*—In 1902 the State established a station on the Willis Vidito place, near the town of Alsea. In 1907 an experimental station was established on this river at the mouth of Rock Creek, about 14 miles above the head of tidewater.

*Yaquina River.*—In 1902 the State established a hatching station on the Big Elk River, a tributary of Yaquina River, about 3 miles above its confluence with the main river. This station was made permanent the next year.

*Tillamook Bay.*—In 1902 the State established a station on Wilson River, a tributary of Tillamook Bay, and about 8 miles above tide water. In 1906 the station was removed to the Trask River, a tributary of Tillamook Bay.

## DISTRIBUTION.

The following table shows the distribution of fry in the coastal streams of the State by the Government and the State.

DISTRIBUTION OF SALMON FRY IN THE COASTAL STREAMS OF OREGON.

| Year ending June 30— | Tillamook Bay and tributaries. | | | Yaquina River. | | | Alsea River. | |
|---|---|---|---|---|---|---|---|---|
| | Chinook. | Silverside. | Steelhead. | Chinook. | Silverside. | Steelhead. | Chinook. | Silverside. |
| | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. |
| 1898 | 19,994 | | | | | | | |
| 1901 | | | | 213,500 | | | | |
| 1903 | 251,875 | | | 557,700 | | | 67,750 | |
| 1904 | 799,300 | | | 3,144,380 | 985,220 | | | |
| 1905 | | | | 1,407,470 | 3,009,075 | 780,500 | 1,000,000 | 1,000,000 |
| 1906 | | | | 816,608 | 4,178,000 | 1,033,150 | 806,938 | 1,785,351 |
| 1907 | 312,700 | 2,648,000 | | 1,919,508 | 1,955,793 | 376,245 | | |
| 1908 | 2,124,000 | 1,629,000 | | 2,193,043 | 909,855 | | 199,700 | 812,300 |
| 1909 | | 4,896,000 | 569,690 | 485,500 | 1,006,309 | | | |
| 1910 | 624,800 | 3,506,990 | 2,309,770 | 324,038 | 28,815 | | | |
| Total | 4,132,669 | 12,679,990 | 2,879,460 | 11,061,747 | 12,073,067 | 2,189,895 | 2,074,388 | 3,597,651 |

| Year ending June 30— | Siuslaw River. | | | Umpqua River. | Coos Bay and tributaries. | | |
|---|---|---|---|---|---|---|---|
| | Chinook. | Silverside. | Steelhead. | Chinook. | Chinook. | Silverside. | Steelhead. |
| | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. | Fry. |
| 1897 | 180,000 | | | | | | |
| 1898 | 440,275 | | | | | | |
| 1899 | 2,700,000 | | | | | | |
| 1901 | 213,500 | | | 730,000 | 235,000 | | |
| 1902 | 112,000 | 214,800 | | 1,136,000 | 2,416,350 | | |
| 1903 | 389,239 | | | 1,596,213 | | | |
| 1904 | 822,567 | | | 1,399,860 | 4,079,274 | | |
| 1905 | 435,162 | 311,900 | | 2,654,925 | 3,877,172 | | |
| 1906 | 1,826,531 | 1,296,732 | 397,355 | 4,903,700 | 2,744,000 | | |
| 1907 | 608,949 | 1,030,486 | | 4,685,900 | 4,014,400 | | |
| 1908 | 729,130 | 1,127,293 | | 2,378,853 | 3,000,000 | | |
| 1909 | 191,267 | 1,092,540 | 98,243 | 4,093,848 | 2,084,500 | 1,032,000 | 222,000 |
| 1910 | 273,352 | 25,289 | | 5,686,273 | 1,683,738 | | |
| Total | 8,921,972 | 5,099,040 | 495,598 | 29,265,572 | 24,134,434 | 1,032,000 | 222,000 |

DISTRIBUTION OF SALMON FRY IN THE COASTAL STREAMS OF OREGON—Continued.

| Year ending June 30— | Coquille River. | | Rogue River and tributaries. | | | |
|---|---|---|---|---|---|---|
| | Chinook. | Silverside. | Chinook. | | Silverside. | Steelhead. |
| | Fry. | Fry. | Fry. | Yearlings, fingerlings, and adults. | Fry. | Fry. |
| 1877 | | | 50,000 | | | |
| 1898 | | | 1,910,045 | | | |
| 1900 | | | 2,156,945 | | | |
| 1901 | 235,000 | | 2,967,058 | | 128,000 | 65,850 |
| 1902 | | | 4,750,763 | | 424,530 | 20,250 |
| 1903 | 3,084,577 | | 3,480,300 | | 680,800 | |
| 1904 | 1,000,000 | | 9,023,428 | | | 8,073 |
| 1905 | 2,210,000 | | 4,758,653 | | 1,250,432 | 531,000 |
| 1906 | 2,978,700 | | 47,500 | 75,000 | | 12,625 |
| 1907 | 2,840,000 | | 5,880,290 | | 1,375,000 | 105,300 |
| 1908 | 2,450,000 | 226,600 | 6,597,027 | 170,051 | 158,000 | 937,680 |
| 1909 | | 1,185,800 | 771,710 | | 643,000 | 878,847 |
| 1910 | | | 1,430,292 | | | 89,850 |
| Total | 14,798,277 | 1,412,400 | 43,824,011 | 245,051 | 4,659,762 | 2,649,475 |

| Year ending June 30— | Total. | | | |
|---|---|---|---|---|
| | Chinook. | | Silverside. | Steelhead. |
| | Fry. | Yearlings, fingerlings, and adults. | Fry. | Fry. |
| 1877 | 50,000 | | | |
| 1897 | 180,000 | | | |
| 1898 | 2,370,314 | | | |
| 1899 | 2,700,000 | | | |
| 1900 | 2,156,945 | | | |
| 1901 | 4,594,058 | | 128,000 | 65,850 |
| 1902 | 8,415,113 | | 639,330 | 20,250 |
| 1903 | 9,427,654 | | 680,800 | |
| 1904 | 20,268,809 | | 985,220 | 8,073 |
| 1905 | 16,343,382 | | 5,571,407 | 1,311,500 |
| 1906 | 14,123,977 | 75,000 | 7,260,083 | 1,443,130 |
| 1907 | 20,261,747 | | 7,009,279 | 481,545 |
| 1908 | 19,671,753 | 170,051 | 4,863,048 | 937,680 |
| 1909 | 7,626,825 | | 9,855,649 | 1,768,780 |
| 1910 | 10,022,493 | | 3,561,094 | 2,399,620 |
| Total | 138,213,070 | 245,051 | 40,553,910 | 8,436,428 |

The following tables show the total output of the hatcheries in Oregon owned by the United States Bureau of Fisheries and the State of Oregon:

OUTPUT OF HATCHERIES OWNED BY THE UNITED STATES BUREAU OF FISHERIES.

| Year ending June 30— | Chinook. | | | Silver. | | |
|---|---|---|---|---|---|---|
| | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
| 1889 | | 4,500,000 | | | | |
| 1890 | 1,000,000 | 2,776,475 | | | | |
| 1891 | 700,000 | 4,901,525 | | | | |
| 1892 | | 1,332,400 | | | | |
| 1893 | | 4,100,000 | | | | |
| 1894 | | 213,000 | | | | |
| 1895 | 23,000 | | | | | |
| 1896 | | [a] 2,832,150 | [b] 557,150 | | | |
| 1897 | | 4,922,634 | | | | |
| 1898 | | 16,915,512 | | | | |
| 1899 | 27,000 | 4,300,200 | | | | |
| 1900 | 1,800,000 | 4,126,367 | | | 146,824 | |
| 1901 | 1,100,000 | 1,669,857 | 1,668 | | 128,000 | |
| 1902 | 1,866,000 | 11,587,061 | | | 424,530 | |
| 1903 | 4,884,400 | 5,453,860 | 250 | 680,800 | | |
| 1904 | 3,113,000 | 15,270,675 | | | | |
| 1905 | 30,000 | 9,822,636 | | | 1,250,432 | |
| 1906 | 28,200 | 2,454,371 | 122,980 | | | 300 |
| 1907 | 1,661,390 | 8,542,104 | | | | |
| 1908 | 2,045,000 | 7,844,827 | 627,856 | | 158,000 | 57,932 |
| 1909 | 3,531,000 | 5,021,655 | 2,763 | | 1,799,915 | |
| 1910 | 3,953,992 | 4,220,197 | 225 | | | |
| Total | 25,762,982 | 122,807,506 | 1,312,892 | 680,800 | 3,907,701 | 58,232 |

| Year ending June 30— | Steelhead trout. | | | Total. | | |
|---|---|---|---|---|---|---|
| | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
| 1889 | | | | | 4,500,000 | |
| 1890 | | | | 1,000,000 | 2,776,475 | |
| 1891 | | | | 700,000 | 4,901,525 | |
| 1892 | | | | | 1,332,400 | |
| 1893 | | | | | 4,100,000 | |
| 1894 | | | | | 213,000 | |
| 1895 | | | | 23,000 | | |
| 1896 | | | | | 2,832,150 | 557,150 |
| 1897 | | | | | 4,922,634 | |
| 1898 | | | | | 16,915,512 | |
| 1899 | 159,000 | 12,125 | | 186,000 | 4,312,325 | |
| 1900 | 415,000 | 99,000 | | 2,215,000 | 4,372,191 | |
| 1901 | 246,000 | 65,850 | 25,000 | 1,346,000 | 1,863,707 | 26,668 |
| 1902 | 481,000 | 20,250 | | 2,347,000 | 12,031,841 | |
| 1903 | 400,000 | 262,700 | 62,033 | 5,965,200 | 5,716,560 | 62,283 |
| 1904 | | 23,205 | 11,090 | 3,113,000 | 15,293,880 | 11,090 |
| 1905 | 50,000 | 534,000 | | 80,000 | 11,607,068 | |
| 1906 | 10,000 | 1,294,185 | 40,383 | 38,200 | 3,748,856 | 163,663 |
| 1907 | 50,000 | 105,300 | | 1,711,390 | 8,647,404 | |
| 1908 | 263,725 | 952,680 | | 2,308,725 | 8,955,507 | 685,788 |
| 1909 | 51,468 | 1,374,308 | | 3,582,468 | 8,195,878 | 2,763 |
| 1910 | | 2,074,188 | | 3,953,992 | 6,294,385 | 225 |
| Total | 2,126,193 | 6,818,091 | 138,506 | 28,569,975 | 133,533,298 | 1,509,630 |

[a] All but 17,000 of these were from eggs received from the California stations.
[b] All raised from eggs received from the California stations.

OUTPUT OF HATCHERIES OWNED BY THE STATE OF OREGON.

| Year. | Chinook fry. | Silverside fry. | Steelhead trout fry. | Total. |
|---|---|---|---|---|
| 1877 | 50,000 | | | 50,000 |
| 1878 | 79,620 | | | 79,620 |
| 1879 | 1,876,500 | | | 1,876,500 |
| 1880 | 1,834,290 | | | 1,834,290 |
| 1881 | 2,554,290 | | | 2,554,290 |
| 1888 | 1,300,000 | | | 1,300,000 |
| 1889 | 4,500,000 | | | 4,500,000 |
| 1890 | 990,000 | | | 990,000 |
| 1891 | [a] 792,000 | | | 792,000 |
| 1895 | 2,500,000 | | | 2,500,000 |
| 1896 | 2,500,000 | | | 2,500,000 |
| 1899 | 2,700,000 | | | 2,700,000 |
| 1900 | 2,500,000 | | 200,000 | 2,700,000 |
| 1901 | 7,562,000 | | 245,000 | 7,807,000 |
| 1902 | 11,220,550 | 7,957,000 | 256,327 | 19,433,877 |
| 1903 | 18,502,072 | 3,288,600 | 300,850 | 22,091,522 |
| 1904 | [b] 48,730,791 | 3,974,185 | 143,849 | 52,848,825 |
| 1905 | 16,393,249 | 5,509,085 | 1,495,735 | 23,398,069 |
| 1906 | [c] 27,404,596 | 7,503,655 | 1,859,696 | 36,767,947 |
| 1907 | [d] 25,156,732 | 6,446,628 | 376,245 | 31,979,605 |
| 1908 | [e] 21,209,394 | 5,359,709 | | 26,569,103 |
| 1909 | [f] 20,108,990 | 9,212,649 | 1,403,129 | 30,724,768 |
| 1910 | [g] 24,169,365 | 3,631,827 | 2,364,120 | 30,165,312 |
| Total | 244,634,439 | 52,883,338 | 8,644,951 | 306,162,728 |

[a] Eggs from which hatched obtained from United States Bureau of Fisheries.
[b] 6,826,540 eggs were obtained from United States Bureau of Fisheries.
[c] 7,714,000 eggs were obtained from United States Bureau of Fisheries.
[d] 3,550,000 eggs were obtained from United States Bureau of Fisheries.
[e] 3,020,000 eggs were obtained from United States Bureau of Fisheries.
[f] 6,581,000 eggs were obtained from United States Bureau of Fisheries.
[g] 6,465,300 eggs were obtained from United States Bureau of Fisheries.

## COLUMBIA RIVER AND TRIBUTARIES.

The first fish-cultural work upon the Columbia River and in Oregon was at Clackamas, on the Clackamas River, a tributary of the Willamette River, which empties into the Columbia River about 180 miles from its mouth.

This hatchery was built in 1876 by the Oregon & Washington Fish Propagating Co., which operated it until 1880. In 1887 the State provided for and there was appointed a State fish commission. Almost the first work of the commission was to spend $12,000 appropriated by the legislature to put in repair and operate this hatchery. On July 1, 1888, it was informally turned over to the United States Commission of Fish and Fisheries, which paid over the purchase price, took formal possession in the following winter, and has operated it ever since, with the exception of several years when the building of dams stopped the progress of salmon to the hatchery. During this period a temporary station for the collection of eggs was established on Sandy River, about 15 miles away, and on Salmon River, a tributary of Sandy River, both tributaries of the Columbia River. Some eggs were also brought in from the California hatcheries and hatched at the Clackamas station. In 1901 the hatchery was moved about 4 miles down the river and has since been operated as both a rearing and a collecting station. In 1901 the State established

another hatchery on the Clackamas River about 30 miles below the main station and between the North and South Forks. In 1904 all were turned over to the United States. In 1907 an experimental station for the collection of eggs of the early variety of chinook salmon was established by the State of Oregon on the Clackamas River below the Portland Railway, Light & Power Co.'s dam at Cazadero, but this is now operated by the United States Bureau of Fisheries.

In 1889 the State established a hatchery in the cannery of Mr. F. M. Warren, at Warrendale, in Multnomah County, on the Columbia River, which was operated in that year and in 1890.

In 1895 some of the Oregon salmon packers combined and organized the Columbia River Packers' Propagating Co., which established a hatchery on the upper Clackamas River at the junction of the Warm Springs and the Clackamas and operated it in 1895 and 1896. The Government operated it in 1897 and 1898, after which it was turned over to the State and moved to the opposite side of the river.

In 1898 the collection of steelhead trout eggs was first undertaken on the northwest coast by the State of Oregon on Salmon River, a tributary of the Columbia River, and met with fair success. In March, 1899, the Government sent a party to the falls of the Willamette River, near Oregon City, to collect steelhead eggs, and also operated for this purpose at its substation on the Salmon River, but the latter effort met with failure, as the rack was washed away. This station was turned over to the State on June 15, 1899.

In 1901 the State of Oregon did some experimental work at Swan Falls, on Snake River, the boundary for a considerable distance between Oregon and Idaho. During the winter and early spring of 1902 the State also worked Tucannon River, which is a tributary of Snake River, for steelhead, but met with poor success. Snake River was worked again in 1902 at the foot of Morton Island, which is situated 2 miles above Ontario, in Malheur County. Title to the necessary property was secured from the War Department in 1903 and permanent buildings were erected.

In 1901 the State of Oregon established an experimental hatchery in Wallowa County, on the Grande Ronde River, at the mouth of a small tributary called the Wenaha River, which enters the main stream about 50 miles from its mouth. A permanent station was established in the canyon about 1½ miles below the Wallowa bridge on the Wallowa River, a tributary of the Grande Ronde River, in 1903.

In 1902 the State of Oregon erected a permanent plant on Salmon River at its junction with Boulder Creek.

In the same year the State established an experimental station on the McKenzie River, a tributary of the Willamette River, about

one-half mile above Vida post office. This experimental work was resumed in 1905 at a point 2 miles below Gate Creek. The hatchery was permanently established at a spot about 30 miles from Eugene and near the town of Leaburg a year or two later.

In 1906 an experimental station was established by the State on Breitenbush Creek a short distance above its junction with the Santiam River, a tributary of the Willamette River, but the plant was destroyed very shortly after its establishment, by a forest fire. An experimental station was reestablished here in 1909, but a heavy freshet raised the river so high that the penned fish escaped around the rack.

In 1909 the State of Oregon built at Bonneville, on Tanner Creek, a tributary of the Columbia River, a large central hatchery capable of handling 60,000,000 eggs, it being the intention of the State to hatch at this plant the eggs collected at other stations.

The first entrance of Washington (then a Territory) into fish-cultural operations was in 1879, when the State fish commissioner paid the Oregon & Washington Fish Propagating Co., which was operating the hatchery on the Clackamas River, $2,000 for salmon fry deposited in that river. In 1893 the State legislature established a hatchery fund which was to be supplied by licenses from certain lines of the fishery business. In 1895 its first hatchery in the Columbia River Basin was built on the Kalama River, about 4 miles distant from its junction with the Columbia, and in Cowlitz County. Another station for the collection and eyeing of eggs was established on the Chinook River, a small stream which empties into Baker Bay near the mouth of the Columbia.

During the fiscal year 1897 the United States Fish Commission established a station on Little White Salmon River, a stream which empties into the Columbia, on the Washington side, about 14 miles above the Cascades. During the fiscal year 1901 an auxiliary station was operated on Big White Salmon River, while fishing was carried on in Eagle and Tanner Creeks, in Oregon, the eggs obtained from these creeks being brought to the Little White Salmon hatchery.

In 1899 the State of Washington built and operated hatcheries on the Wenatchee River, a tributary of the Columbia River, about 1½ miles from Chiwaukum station on the Great Northern Railway, and on Wind River, a tributary of the Columbia, about 1 mile from the junction.

In 1900 Washington State hatcheries were established in the Columbia River basin as follows: White River hatchery, which was built on Coos Creek, which empties into a tributary of the White River, the location being about 2½ miles from where the Green River joins the White River; Methow River hatchery, built on the Methow River at the point where it is joined by the Twisp, about

22 miles from the Columbia River; Colville River hatchery, built on the north bank of Colville River, about 1½ miles from its mouth, and about 1 mile from Kettle Falls; Klickitat River hatchery, located on the east bank of the Klickitat River, about 6 miles from its mouth; and one on the Little Spokane River, about 10 miles from its mouth and about 9 miles north of the city of Spokane. The Klickitat River hatchery never was operated, while most of the others were operated intermittently.

In 1906 a hatchery was established by the State of Washington on the Lewis River, some distance above the town of Woodland.

The following table shows the plants of salmon and steelhead trout in the Columbia River and its tributaries by the Bureau of Fisheries and the States of Oregon and Washington:

TABLE SHOWING THE PLANTS OF SALMON FRY IN THE COLUMBIA RIVER BASIN SINCE 1877.

| Year ending June 30— | Columbia River and tributaries. | | | Total. |
|---|---|---|---|---|
| | Chinook fry. | Silverside fry. | Steelhead trout fry. | |
| 1877 | 300,000 | | | 300,000 |
| 1878 | 79,620 | | | 79,620 |
| 1879 | 3,076,500 | | | 3,076,500 |
| 1880 | 1,834,290 | | | 1,834,290 |
| 1881 | 2,554,290 | | | 2,554,290 |
| 1888 | 1,300,000 | | | 1,300,000 |
| 1889 | 4,500,000 | | | 4,500,000 |
| 1890 | 3,756,475 | | | 3,756,475 |
| 1891 | 5,694,000 | | | 5,694,000 |
| 1892 | 1,332,400 | | | 1,332,400 |
| 1893 | 4,100,000 | | | 4,100,000 |
| 1894 | 213,000 | | | 213,000 |
| 1895 | [a] 2,523,000 | | | 2,523,000 |
| 1896 | [b] 10,389,300 | | | 10,389,300 |
| 1897 | 10,641,394 | | | 10,641,394 |
| 1898 | 26,212,074 | | | 26,212,074 |
| 1899 | 19,979,241 | | 8,625 | 19,987,866 |
| 1900 | 22,510,869 | 7,175,824 | 299,000 | 29,985,693 |
| 1901 | [c] 24,978,978 | 5,559,750 | 245,000 | 30,783,728 |
| 1902 | 44,328,085 | 17,545,724 | 256,327 | 62,130,136 |
| 1903 | 40,174,313 | 8,721,720 | [d] 600,583 | 49,496,616 |
| 1904 | 71,694,587 | 8,422,085 | 158,981 | 80,275,653 |
| 1905 | 17,107,217 | 1,354,610 | [e] 768,235 | 19,230,062 |
| 1906 | [f] 36,372,785 | [g] 828,872 | [h] 1,769,494 | 38,971,151 |
| 1907 | 23,171,235 | 2,657,349 | 26,640 | 25,855,224 |
| 1908 | [i] 34,852,008 | 1,705,543 | 15,000 | 36,572,551 |
| 1909 | [j] 33,098,943 | 2,439,415 | [k] 1,058,657 | 36,597,015 |
| 1910 | [l] 37,744,002 | 3,374,733 | [m] 2,063,688 | 43,182,423 |
| Total | 484,518,606 | 59,785,625 | 7,270,230 | 551,574,461 |

[a] Includes 23,000 eggs.
[b] Includes 557,150 yearlings, fingerlings, or adults.
[c] Includes 1,668 yearlings, fingerlings, or adults.
[d] Includes 37,033 yearlings, fingerlings, or adults.
[e] Includes 50,000 eggs.
[f] Includes 48,200 eggs and 47,980 yearlings, fingerlings, or adults.
[g] Includes 300 yearlings, fingerlings, or adults.
[h] Includes 24,383 yearlings, fingerlings, or adults, and 58,000 eggs.
[i] Includes 1,995,746 yearlings, fingerlings, or adults.
[j] Includes 16,949 yearlings, fingerlings, or adults.
[k] Includes 50,000 eggs.
[l] Includes 225 yearlings, fingerlings, or adults.
[m] Includes 25,000 eggs.

## WASHINGTON.

*Willapa River.*—In 1899 Washington established a hatchery on Trap Creek, a tributary of the Willapa River, situated about 200 yards from the creek's mouth.

*Chehalis River.*—The construction of a hatchery on the Chehalis River, about 4 miles above the city of Montesano, was begun by the State in October, 1897, but owing to bad weather and extreme high water was not completed until late in 1898. The hatchery was a failure until 1902 when a fair season was had, as was again true in 1903. It was not operated in 1904. Since the State began taking eggs from the Satsop River, a tributary of the Chehalis, it has been possible to fill the hatchery each season.

*Puget Sound and tributaries.*—In 1896 the State established a hatchery on Baker Lake, which is the head of Baker River, a tributary of the Skagit River, and this was the first establishment for the hatching of sockeye salmon. In July, 1899, it was sold to the United States Fish Commission. In 1901 steelhead trout eggs were collected on Phinney Creek, about 5 miles from the town of Birdsview, and some 30 miles from Baker Lake. In 1901 an auxiliary station was opened at Birdsview, on Skagit River, and steelhead trout eggs were collected on Phinney and Grandy Creeks and brought to Baker Lake to be hatched.

In 1898 a private hatchery (the necessary money being raised by subscription among the residents of Fairhaven, now Bellingham, and vicinity) was built near Lake Samish, a few miles from Fairhaven.

In 1899 a hatchery was built by the State on Kendall Creek, a tributary of the Nooksack River, about 300 yards from same, and about 2 miles from the railway station of Kendall. Except in 1903, this hatchery has since been operated continuously. An eyeing station was built in 1907 on the south fork of the Nooksack River, about 1 mile from Acme.

In the same year the State built a hatchery on the Skokomish River, about 4 miles from its mouth. An eyeing station was also erected on the north fork of the same river. The main station was not operated in 1904 and only on a small scale in 1903 and 1905.

The State in 1899 built a hatchery on Friday Creek, a tributary of the Samish River, situated about 1 mile from the mouth of the creek.

The following State hatcheries were first operated in 1900. Snohomish hatchery, built on the west bank of the Skykomish River, a few miles from its mouth; Nisqually River hatchery, built on Muck Creek, about one-half mile from the Nisqually River, and about 4 miles from the town of Roy, in Pierce County; and the Stillaguamish hatchery, located on the Stillaguamish River, about 4 miles from the

town of Arlington, in Snohomish County. The latter has since been moved to Jim Creek, a tributary of the south branch of the Stillaguamish River.

The Startup hatchery, located near Startup, on the Skykomish River, was formerly used as a collecting station for the Snohomish hatchery. It is still used for this purpose, but also retains and hatches a considerable quantity of spawn. The station is about 4 miles from the Snohomish hatchery.

In 1900 the State established a fisheries experimental station at Keyport Landing, on the east arm of Port Orchard Bay, with Pearson as the nearest post office. The work of the station is devoted to salmon and oysters.

The State established a hatchery on the Dungeness River, about 7 miles from the town of Dungeness, in Clallam County, in 1901. In 1906 it constructed a hatchery on a small tributary of the Skagit River, between Hamilton and Lyman. The station built on Sauk River, a tributary of the Skagit, has been operated only occasionally since the Skagit hatchery was built.

The United States Bureau of Fisheries has now (1911) under construction hatcheries on the Duckabush and Quilcene Rivers in Hoods Canal.

The following tables show the total output of the salmon hatcheries in the State of Washington owned by the United States Bureau of Fisheries and the hatcheries owned by the State itself:

OUTPUT OF THE SALMON HATCHERIES IN WASHINGTON OWNED BY THE UNITED STATES BUREAU OF FISHERIES.

| Year ending June 30— | Chinook. | | | Sockeye, or blueback. | | | Silver. | |
|---|---|---|---|---|---|---|---|---|
| | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Eggs. | Fry. |
| 1897 | ..... | 1,848,760 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1898 | ..... | 7,391,886 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1899 | 4,926,000 | 1,791,056 | ..... | ..... | ..... | ..... | ..... | ..... |
| 1900 | 2,686,000 | 6,626,947 | ..... | ..... | 10,683,000 | ..... | ..... | ..... |
| 1901 | 6,581,000 | 5,427,680 | ..... | ..... | 3,834,453 | ..... | ..... | 174,041 |
| 1902 | ..... | 15,637,687 | ..... | ..... | 3,371,000 | ..... | ..... | ..... |
| 1903 | ..... | 16,774,030 | ..... | ..... | 3,731,789 | ..... | ..... | 81,812 |
| 1904 | 7,506,000 | 17,386,183 | ..... | ..... | 3,855,000 | ..... | ..... | 3,984,645 |
| 1905 | ..... | 4,236,276 | ..... | ..... | 7,819,281 | 10,000 | 107,000 | 8,071,081 |
| 1906 | 7,714,000 | 14,846,905 | ..... | 880,000 | 3,285,130 | 9,500 | 239,180 | 6,445,574 |
| 1907 | 3,550,000 | 6,512,738 | ..... | ..... | 4,224,255 | ..... | 760,000 | 3,636,952 |
| 1908 | 1,485,000 | 12,372,503 | 1,537,941 | 75,000 | 8,514,305 | ..... | 296,000 | 13,262,714 |
| 1909 | 3,050,000 | 11,565,553 | 14,186 | 100,000 | 5,430,626 | ..... | 272,000 | 7,661,110 |
| 1910 | 3,813,250 | 9,175,610 | ..... | ..... | 4,554,825 | ..... | 275,000 | 10,888,025 |
| Total | 41,311,250 | 131,593,814 | 1,552,127 | 1,055,000 | 59,303,664 | 19,500 | 1,949,180 | 54,205,954 |

OUTPUT OF THE SALMON HATCHERIES IN WASHINGTON OWNED BY THE UNITED STATES BUREAU OF FISHERIES—Continued.

| Year ending June 30— | Humpback. | | Steelhead trout. | | | Total. | | |
|---|---|---|---|---|---|---|---|---|
| | Eggs. | Fry. | Eggs. | Fry. | Fingerlings, yearlings, and adults. | Eggs. | Fry. | Fingerlings, yearlings, and adults. |
| 1897 | | | | | | | 1,848,760 | |
| 1898 | | | | | | | 7,391,886 | |
| 1899 | | | | | | 4,926,000 | 1,791,056 | |
| 1900 | | | | 26,000 | | 2,686,000 | 17,335,947 | |
| 1901 | | | | | | 6,581,000 | 9,436,174 | |
| 1902 | | | | 110,000 | | | 19,118,687 | |
| 1903 | | | 80,000 | 440,000 | 223,815 | 80,000 | 21,027,631 | 223,815 |
| 1904 | | 176,597 | 255,000 | 70,000 | | 7,761,000 | 25,472,425 | |
| 1905 | | | 414,400 | 3,205 | | 521,400 | 20,129,843 | 10,000 |
| 1906 | 2,000 | 969,990 | 348,000 | 540,000 | | 9,183,180 | 26,087,599 | 9,500 |
| 1907 | | | 200,000 | 941,505 | | 4,510,000 | 15,315,450 | |
| 1908 | 502,000 | 6,764,762 | 224,000 | 136,916 | | 2,582,000 | 41,051,200 | 1,537,941 |
| 1909 | | | 220,000 | 717,691 | | 3,642,000 | 25,374,980 | 14,186 |
| 1910 | | 1,368,000 | 300,000 | 1,437,038 | | 4,388,250 | 27,423,498 | |
| Total | 504,000 | 9,279,349 | 2,041,400 | 4,422,355 | 223,815 | 46,860,830 | 258,805,136 | 1,795,442 |

OUTPUT OF THE SALMON HATCHERIES OWNED BY THE STATE OF WASHINGTON.

| Year ending June 30— | Chinook fry. | Dog fry. | Humpback fry. | Silverside, or coho, fry. | Sockeye, or blueback, fry. | Steelhead trout fry. | Total. |
|---|---|---|---|---|---|---|---|
| 1896 | 4,500,000 | | | | | | 4,500,000 |
| 1897 | 4,050,000 | | | | 5,500,000 | | 9,550,000 |
| 1898 | 4,275,000 | | | | 5,400,000 | | 9,675,000 |
| 1899 | 8,595,000 | | | 189,000 | | | 8,784,000 |
| 1900 | 12,251,000 | 10,301,760 | | 13,778,280 | | 1,736,560 | 38,068,200 |
| 1901 | 12,275,400 | 16,478,280 | | 19,747,894 | | 1,398,476 | 49,900,050 |
| 1902 | 14,766,822 | 9,937,390 | | 32,964,593 | | 2,481,371 | 60,150,176 |
| 1903 | 14,283,499 | 9,937,390 | | 28,659,079 | | 3,134,076 | 56,014,044 |
| 1904 | 13,261,184 | | 295,200 | 15,725,196 | | 3,868,866 | 33,150,446 |
| 1905 | 7,101,180 | | | 12,226,294 | | 2,433,635 | 21,761,109 |
| 1906 | 10,943,550 | 3,268,800 | | 28,906,380 | | 2,769,784 | 45,888,514 |
| 1907 | 8,897,670 | 6,120,000 | | 28,668,600 | | 3,575,943 | 47,262,213 |
| 1908 | 18,647,600 | 4,342,350 | 2,655,900 | 29,273,202 | | 4,578,075 | 59,497,127 |
| 1909 | 17,440,950 | 8,218,000 | | 24,543,200 | | 4,080,450 | 54,282,600 |
| 1910 | 21,168,350 | 8,607,500 | 519,600 | 30,894,100 | | 4,855,000 | 66,044,550 |
| Total | 172,457,805 | 77,211,470 | 3,470,700 | 265,575,818 | 10,900,000 | 34,912,236 | 564,528,029 |

NOTE.—As the printed reports of the State in many instances report as the output the number of eggs gathered, it has been necessary in such cases to make an arbitrary reduction from these figures, in order to allow for the loss in the egg stage.

The following table shows the plantings made in waters of Washington other than the Columbia River by the United States Bureau of Fisheries and the State of Washington:

PLANTS OF SALMON FRY IN THE WATERS OF WASHINGTON OTHER THAN THE COLUMBIA RIVER.

| Year ending June 30— | Puget Sound and tributaries. | | | | | |
|---|---|---|---|---|---|---|
| | Chinook. | Sockeye. | Silver, or coho. | Humpback. | Dog. | Steelhead. |
| 1897 | | 5,500,000 | | | | |
| 1898 | | 5,400,000 | | | | |
| 1899 | 7,470,000 | | 189,000 | | | |
| 1900 | | 10,683,000 | 6,749,280 | | 10,301,760 | 1,572,560 |
| 1901 | 300,000 | 3,834,453 | 14,360,185 | | 16,478,280 | 1,398,476 |
| 1902 | 2,141,322 | 3,371,000 | 23,161,069 | | 9,937,390 | 2,591,371 |
| 1903 | 2,113,850 | 3,731,789 | 21,507,771 | | 9,937,390 | [a] 3,326,091 |
| 1904 | 1,865,933 | 3,855,000 | 14,071,845 | 471,797 | | 3,518,476 |
| 1905 | 2,590,738 | | 16,441,375 | | | [b] 1,329,940 |
| 1906 | 4,819,290 | [c] 3,582,630 | [d] 29,770,414 | 969,990 | 1,800,000 | [e] 3,177,174 |
| 1907 | 3,907,598 | | 26,960,552 | 4,224,255 | 5,220,000 | 3,964,308 |
| 1908 | 8,356,709 | 8,514,305 | 37,613,466 | 9,420,662 | 2,278,350 | 4,566,491 |
| 1909 | 9,647,288 | 5,430,626 | 28,622,310 | | 6,048,000 | [f] 4,499,141 |
| 1910 | 11,681,060 | 4,554,825 | 36,837,125 | 1,887,600 | 7,748,500 | 6,292,338 |
| Total | 54,893,788 | 58,457,628 | 256,284,392 | 16,974,304 | 69,749,670 | 36,236,366 |

| Year ending June 30— | Chehalis River. | | | Willapa River. | | |
|---|---|---|---|---|---|---|
| | Chinook. | Silver, or coho. | Dog. | Chinook. | Silver, or coho. | Steelhead. |
| 1899 | 1,215,000 | | | | | |
| 1900 | 2,355,300 | | | 881,000 | | 190,000 |
| 1901 | 1,909,800 | | | 653,400 | | |
| 1903 | | | | 2,163,019 | 1,800,000 | 500,000 |
| 1904 | 900,000 | | | 819,504 | 204,876 | 420,390 |
| 1905 | | | | 630,000 | 1,800,000 | 288,000 |
| 1906 | | 2,563,380 | 1,468,800 | 529,650 | 2,160,000 | 171,550 |
| 1907 | | 2,250,000 | 900,000 | 393,660 | 2,250,000 | 526,500 |
| 1908 | 163,000 | 3,275,000 | 2,064,000 | 678,600 | 654,500 | 148,500 |
| 1909 | 148,000 | 1,800,000 | 1,757,000 | 322,200 | 504,000 | 399,000 |
| 1910 | 403,000 | 1,577,000 | 859,000 | 455,200 | 64,000 | |
| Total | 7,094,100 | 11,465,380 | 7,048,800 | 7,526,233 | 9,437,376 | 2,643,940 |

| Year ending June 30— | Total by species. | | | | | | Grand total. |
|---|---|---|---|---|---|---|---|
| | Chinook. | Sockeye. | Silver, or coho. | Humpback. | Dog. | Steelhead. | |
| 1878 | [g] 3,000 | | | | | | 3,000 |
| 1897 | | 5,500,000 | | | | | 5,500,000 |
| 1898 | | 5,400,000 | | | | | 5,400,000 |
| 1899 | 8,685,000 | | 189,000 | | | | 8,874,000 |
| 1900 | 3,236,300 | 10,683,000 | 6,749,280 | | 10,301,760 | 1,762,560 | 32,732,900 |
| 1901 | 2,863,200 | 3,834,453 | 14,360,185 | | 16,478,280 | 1,398,476 | 38,934,594 |
| 1902 | 2,141,322 | 3,371,000 | 23,161,069 | | 9,937,390 | 2,591,371 | 41,202,152 |
| 1903 | 4,276,869 | 3,731,789 | 23,307,771 | | 9,937,390 | 3,826,091 | 45,079,910 |
| 1904 | 3,585,437 | 3,855,000 | 14,276,721 | 471,797 | | 3,938,866 | 26,127,821 |
| 1905 | 3,220,738 | | 18,241,375 | | | 1,617,940 | 23,080,053 |
| 1906 | 5,348,940 | 3,582,630 | 34,493,794 | 969,990 | 3,268,800 | 3,348,724 | 51,012,878 |
| 1907 | 4,301,258 | | 31,460,552 | 4,224,255 | 6,120,000 | 4,490,808 | 50,596,873 |
| 1908 | 9,198,309 | 8,514,305 | 41,542,966 | 9,420,662 | 4,342,350 | 4,714,991 | 77,733,583 |
| 1909 | 10,117,488 | 5,430,626 | 30,926,310 | | 7,805,000 | 4,898,141 | 59,177,565 |
| 1910 | 12,539,260 | 4,554,825 | 38,478,125 | 1,887,600 | 8,607,500 | 6,292,338 | 72,359,648 |
| Total | 69,517,121 | 58,457,628 | 277,187,148 | 16,974,304 | 76,798,470 | 38,880,306 | 537,814,977 |

[a] Of these, 218,200 were yearlings, fingerlings, or adults.
[b] Of these, 14,400 were eggs.
[c] Of these, 9,500 were yearlings, fingerlings, or adults.
[d] Of these, 14,840 were yearlings, fingerlings, or adults.
[e] Of these, 15,000 were yearlings, fingerlings, or adults.
[f] Includes 100,000 eggs.
[g] These were brought from the Clackamas (Oregon) station and planted in some unnamed lake.

## BRITISH COLUMBIA.

*Fraser River.*—The first hatchery established by the Dominion of Canada on the Pacific coast was erected in 1884 at what is now Bon Accord, a point on the lower river some 4 miles above New Westminster, and on the opposite shore. The next built was in 1901 on Granite Creek, Shuswap Lake, which discharges into the Fraser through the South Thompson River, the lake being about 280 miles from New Westminster. In 1904 another hatchery was established on Harrison Lake on the Lillooet River, first large tributary of the Fraser on the north side; also one about 4 miles east of the lower extremities of Pemberton Meadows, at the junction of Owl Creek and the Birkenhead River, 4 miles above its confluence with the eastern branch of the Lillooet River, which in turn discharges into Lillooet Lake. In 1907 a hatchery was built on Stuart Lake, near the headwaters of the Fraser.

The Province of British Columbia owns Seton Lake Hatchery, which was established in 1903 on Lake Creek, on the north side, about half a mile from the outlet of Seton Lake, and it has been operated continuously ever since. Seton Lake is a part of the Fraser River chain and is some 300 miles above the mouth of the river. Lake Creek, the outlet of Seton Lake, empties into the Cayoosh Creek, a tributary of the Fraser, 45 miles north of the latter's junction with the Thompson, and 1 mile south of the town of Lillooet.

*Nimpkish River.*—In 1902 Mr. S. A. Spencer, of the Alert Bay cannery (now belonging to the British Columbia Packers' Association), in return for certain special fishery privileges granted by the Dominion, established a hatchery on this river, which is located on the northeast shore of Vancouver Island. The hatchery was burned down in 1903, but was immediately rebuilt. Since its establishment it has been operated by the Dominion.

*Rivers Inlet.*—A hatchery was established by the Dominion on McTavish Creek, one of the tributaries of Oweekayno Lake, about 20 miles up Rivers Inlet, in 1905, and has been operated ever since.

*Skeena River.*—In 1902 the Dominion established a hatchery on Lakelse Lake, in the Skeena River basin, about 65 miles up the river from Port Essington. In 1907 another was constructed on Babine Lake, the source of the Skeena River.

The following table shows the plantings made in the waters of British Columbia from the Dominion and provincial hatcheries:

PLANTS OF SALMON FRY MADE IN THE WATERS OF BRITISH COLUMBIA.

| Year. | Fraser River. | | | | | | |
|---|---|---|---|---|---|---|---|
| | Dog. | Coho. | Spring, or king. | Humpback. | Sockeye. | Steelhead trout. | Total. |
| 1885 | | | | | 1,800,000 | | 1,800,000 |
| 1886 | | | | | 2,625,000 | | 2,625,000 |
| 1887 | | | | | 4,414,000 | | 4,414,000 |
| 1888 | | | | | 5,807,000 | | 5,807,000 |
| 1889 | | | | | 4,419,000 | | 4,419,000 |
| 1890 | | | | | 6,640,000 | | 6,640,000 |
| 1891 | | | | | 3,603,800 | | 3,603,800 |
| 1892 | | | | | 6,000,000 | | 6,000,000 |
| 1893 | | | | | 5,674,000 | | 5,674,000 |
| 1894 | | | | | 6,300,000 | | 6,300,000 |
| 1895 | | | | | 6,390,000 | | 6,390,000 |
| 1896 | | | | | 10,393,000 | | 10,393,000 |
| 1897 | | | | | 5,928,000 | | 5,928,000 |
| 1898 | | | | | 5,850,000 | | 5,850,000 |
| 1899 | | | | | 4,742,000 | | 4,742,000 |
| 1900 | | | | | 6,200,000 | | 6,200,000 |
| 1901 | | | | | [No fish.] | | |
| 1902 | | 90,000 | | | 15,808,000 | 75,000 | 15,973,000 |
| 1903 | 75,000 | 1,750,000 | 22,000 | | 12,521,000 | | 14,368,000 |
| 1904 | | 210,000 | | 50,000 | 13,729,200 | 12,000 | 14,001,200 |
| 1905 | | 5,576,100 | 4,381,400 | | 9,244,300 | | 19,201,800 |
| 1906 | | 4,774,000 | 1,791,500 | | 100,479,000 | 4,000 | 107,048,500 |
| 1907 | | 3,219,200 | 1,814,900 | | 36,965,900 | | 42,000,000 |
| 1908 | | 5,890,000 | 2,815,000 | 22,500,000 | 51,855,200 | | 83,060,200 |
| 1909 | | 7,375,400 | 5,772,400 | | 41,909,500 | | 55,057,300 |
| 1910 | | 450,000 | 6,300,000 | | 105,312,500 | | 112,062,500 |
| Total | 75,000 | 29,334,700 | 22,897,200 | 22,550,000 | 474,610,400 | 91,000 | 549,558,300 |

| Year. | Skeena River. | Rivers Inlet. | | | Nimpkish River. |
|---|---|---|---|---|---|
| | Sockeye. | Sockeye. | Spring, or king. | Total. | Sockeye. |
| 1903 | 3,450,000 | | | | 1,636,000 |
| 1904 | 4,000,000 | | | | 2,496,000 |
| 1905 | 3,767,900 | | | | 2,850,000 |
| 1906 | 3,784,450 | 8,000,000 | | 8,000,000 | 4,873,400 |
| 1907 | 4,125,750 | 8,440,000 | | 8,440,000 | 4,870,000 |
| 1908 | 8,946,950 | 8,594,000 | 4,706,000 | 13,300,000 | 4,800,000 |
| 1909 | 11,882,400 | 13,300,000 | | 13,300,000 | 4,500,000 |
| 1910 | [a] 11,521,700 | 12,750,000 | | 12,750,000 | 5,055,000 |
| Total | 51,479,150 | 51,084,000 | 4,706,000 | 55,790,000 | 31,080,400 |

[a] Includes 80,000 coho fry.

PLANTS OF SALMON FRY MADE IN THE WATERS OF BRITISH COLUMBIA—Con.

| Year. | Total by species. | | | | | | Grand total. |
|---|---|---|---|---|---|---|---|
| | Dog. | Coho. | Spring, or king. | Humpback. | Sockeye. | Steelhead trout. | |
| 1885 | | | | | 1,800,000 | | 1,800,000 |
| 1886 | | | | | 2,625,000 | | 2,625,000 |
| 1887 | | | | | 4,414,000 | | 4,414,000 |
| 1888 | | | | | 5,807,000 | | 5,807,000 |
| 1889 | | | | | 4,419,000 | | 4,419,000 |
| 1890 | | | | | 6,640,000 | | 6,640,000 |
| 1891 | | | | | 3,603,800 | | 3,603,800 |
| 1892 | | | | | 6,000,000 | | 6,000,000 |
| 1893 | | | | | 5,674,000 | | 5,674,000 |
| 1894 | | | | | 6,300,000 | | 6,300,000 |
| 1895 | | | | | 6,390,000 | | 6,390,000 |
| 1896 | | | | | 10,393,000 | | 10,393,000 |
| 1897 | | | | | 5,928,000 | | 5,928,000 |
| 1898 | | | | | 5,850,000 | | 5,850,000 |
| 1899 | | | | | 4,742,000 | | 4,742,000 |
| 1900 | | | | | 6,200,000 | | 6,200,000 |
| 1902 | | 90,000 | | | 15,808,000 | 75,000 | 15,973,000 |
| 1903 | 75,000 | 1,750,000 | 22,000 | | 17,607,000 | | 19,454,000 |
| 1904 | | 210,000 | | 50,000 | 20,225,200 | 12,000 | 20,497,200 |
| 1905 | | 5,576,100 | 4,381,400 | | 15,862,200 | | 25,819,700 |
| 1906 | | 4,774,000 | 1,791,500 | | 117,136,850 | 4,000 | 123,706,350 |
| 1907 | | 3,219,200 | 1,814,900 | | 54,401,650 | | 59,435,750 |
| 1908 | | 5,890,000 | 7,521,000 | 22,500,000 | 74,196,150 | | 110,107,150 |
| 1909 | | 7,375,400 | 5,772,400 | | 71,591,900 | | 84,739,700 |
| 1910 | | 450,000 | 6,300,000 | | 134,639,200 | | 141,389,200 |
| Total | 75,000 | 29,334,700 | 27,603,200 | 22,550,000 | 608,253,950 | 91,000 | 687,907,850 |

## ALASKA.

In 1891 several of the canneries operating at Karluk, on Kodiak Island, combined forces and built a hatchery on the lagoon at that place. As the cannery men were at swords' points in regard to their fishing rights on the spit, in 1892 the hatchery was closed. In May, 1896, the Alaska Packers' Association broke ground for a hatchery at the eastern end of the lagoon, near the outlet of Karluk River, a short distance from where the hatchery was located in 1891, and has operated this plant ever since.

In 1892 Capt. John C. Callbreath, manager of the Point Ellis cannery, on Kuiu Island, operated a small hatchery on the left bank of Kutlakoo stream. It was a very primitive place, and an exceptionally high tide destroyed the whole plant in September. It was never rebuilt.

Capt. Callbreath, however, after seeing to the operation of the hatchery, had returned to Wrangell during the summer, where his attention was again attracted to hatchery work, and in the fall of 1892 he built a small hatchery on Jadjeska stream, Etolin Island, about 200 yards from its mouth. The stream is about one-half mile in length and is the outlet of a small lake. Finding the location unsuitable Capt. Callbreath removed the hatchery in 1893 to the northern side of the lake, about three-eighths of a mile from the head of the outlet, where it still stands. The owner's intention was to build up a stream which had a small natural run of red salmon until it had a large run,

with the hope that the Government would then give him the exclusive right to take these fish from the stream for commercial purposes. The experiment was kept up until the end of the season of 1905, when Capt. Callbreath's failing eyesight compelled the cessation of the actual hatching. Since then a man has been stationed on the stream during the run of spawning fish for the purpose of lifting them over the dam, so that they could reach the spawning beds at the head of the lake. The owner's expectation of a big run as a result of hatching operations was never realized.

In 1896 the Baranof Packing Company, which operated a cannery on Redfish Bay, on the western coast of Baranof Island, built a small hatchery on the lake at the head of Redfish stream. The following winter was so cold that not only the flume, but the whole cataract, froze solid, and as the hatchery was thus left without water the eggs were put into the lake and left to their fate and the hatchery closed down permanently.

In 1897 the North Pacific Trading & Packing Company, at Klawak, Prince of Wales Island, established a hatchery near the head of Klawak stream, close to Klawak Lake. In 1898 the plant was moved to the mouth of a small stream entering the lake about halfway up the western shore. This hatchery has been operated continuously ever since. In 1909 the North Alaska Salmon Co. acquired a half interest in it.

The Pacific Steam Whaling Company in 1898 erected a small hatchery on Hetta Lake, on the west side of Prince of Wales Island, which was operated until the close of the hatching season of 1903–4, when the Pacific Packing & Navigation Company, successor to the original owner, went into the hands of a receiver. In 1907 it was reopened by the Northwestern Fisheries Company, which had acquired the interests of the old company, and has been operated each season since.

Up to 1900 the work of hatching salmon was entirely voluntary on the part of the packers. On May 2 of that year the following regulation was promulgated at the Treasury Department, which at that time had control of the Alaska salmon-inspection service:

7. Each person, company, or corporation taking salmon in Alaskan waters shall establish and conduct, at or near the fisheries operated by him or them, a suitable artificial propagating plant or hatchery; and shall produce yearly and place in the natural spawning waters of each fishery so operated red salmon fry in such numbers as shall be equal to at least four times the number of mature fish taken from the said fisheries, by or for him or them, during the preceding fishing season. The management and operation of such hatcheries shall be subject to such rules and regulations as may hereafter be prescribed by the Secretary of the Treasury. They shall be open for inspection by the authorized official of this department; annual reports shall be made, giving full particulars of the number of male and female salmon stripped, the number of eggs treated, the number and percentage of fish hatched, and all other conditions of interest; and there shall be made a sworn yearly statement of the number of fry planted and the exact location where said planting was done.

On January 24, 1902, this regulation was amended so as to require the planting of "red salmon fry in such numbers as shall be equal to at least ten times the number of salmon of all varieties taken from the said fisheries."

Although the regulation was mandatory, but few of the packers obeyed it, some because no suitable place was to be found within a reasonable distance of their plants, others because the establishment and operation of such a hatchery would cost more than their returns from the industry justified, and others because of lack of knowledge required in hatchery work. The greater number of them absolutely ignored it, and as a result those who conformed to the regulation were placed under a heavy financial handicap. The injustice of this arrangement was patent on its face, and in 1906, when a comprehensive revision of the law was made by Congress, provision was made for reimbursing in the future those cannery men who operated salmon hatcheries. The section covering this point reads as follows:

SEC. 2. That the catch and pack of salmon made in Alaska by the owners of private salmon hatcheries operated in Alaska shall be exempt from all license fees and taxation of every nature at the rate of ten cases of canned salmon to every one thousand red or king salmon fry liberated, upon the following conditions:

That the Secretary of Commerce and Labor may from time to time, and on the application of the hatchery owner shall, within a reasonable time thereafter, cause such private hatcheries to be inspected for the purpose of determining the character of their operations, efficiency, and productiveness, and if he approve the same shall cause notice of such approval to be filed in the office of the clerk or deputy clerk of the United States district court of the division of the District of Alaska wherein any such hatchery is located, and shall also notify the owners of such hatchery of the action taken by him. The owner, agent, officer, or superintendent of any hatchery the effectiveness and productiveness of which has been approved as above provided shall, between the thirtieth day of June and the thirty-first day of December of each year, make proof of the number of salmon fry liberated during the twelve months immediately preceding the thirtieth day of June, by a written statement under oath. Such proof shall be filed in the office of the clerk or deputy clerk of the United States district court of the division of the District of Alaska wherein such hatchery is located, and when so filed shall entitle the respective hatchery owners to the exemption as herein provided; and a false oath as to the number of salmon fry liberated shall be deemed perjury and subject the offender to all the pains and penalties thereof. Duplicates of such statements shall also be filed with the Secretary of Commerce and Labor.

It shall be the duty of such clerk or deputy clerk in whose office the approval and proof heretofore provided for are filed to forthwith issue to the hatchery owner, causing such proofs to be filed, certificates which shall not be transferable and of such denominations as said owner may request (no certificate to cover fewer than one thousand fry), covering in the aggregate the number of fry so proved to have been liberated; and such certificates may be used at any time by the person, company, corporation, or association to whom issued for the payment pro tanto of any license fees or taxes upon or against or on account of any catch or pack of salmon made by them in Alaska; and it shall be the duty of all public officials charged with the duty of collecting or receiving such license fees or taxes to accept such certificates in lieu of money in payment of all license fees or taxes upon or against the pack of canned salmon at the ratio of one thousand fry for each ten cases of salmon. No hatchery

owner shall obtain the rebates from the output of any hatchery to which he might otherwise be entitled under this act unless the efficiency of said hatchery has first been approved by the Secretary of Commerce and Labor in the manner herein provided for.

In 1901 the Pacific Steam Whaling Company established two small hatcheries—one on Nagel stream, which enters the northern side of Quadra Lake, on the mainland of southeast Alaska, and one on a stream entering Freshwater Lake Bay, Chatham Strait. Both were closed down in 1904 when the company failed. In 1908 the Northwestern Fisheries Company, which had acquired the Quadra plant, removed it to a small stream entering the head of the lake and has operated it ever since.

In 1901 the Alaska Packers' Association erected a hatchery on Heckman Lake, the third of a series of lakes on Naha stream, Revillagigedo Island, and about 8 miles from Loring, where the association has a cannery. This is without question the largest and costliest salmon hatchery in the world, having a capacity of 110,000,000 eggs, and the association is entitled to great credit for the public spirit it has shown and the work it has done, entirely without remuneration until 1906, in building and operating not only this hatchery but also the one at Karluk.

The Union Packing Company, at Kell Bay, on Kuiu Island, and Mr. F. C. Barnes, at Lake Bay, on Prince of Wales Island, in 1902 built and operated small hatcheries, both of which were abandoned after one season's work.

Up to 1905 the work of hatching salmon in Alaska was confined to the salmon cannery men. In that year, however, the United States Bureau of Fisheries erected a hatchery on Yes Lake, which empties through a short stream into Yes Bay, on Cleveland Peninsula. In 1907 the bureau constructed another hatchery, on Afognak Lake, near Litnik Bay, Afognak Island.

The following tables show the eggs gathered and the fry planted from the government and privately owned hatcheries in Alaska:

OUTPUT OF THE SALMON HATCHERIES IN ALASKA OWNED BY THE UNITED STATES BUREAU OF FISHERIES, 1906 TO 1910.

| Year ending June 30— | Yes Lake hatchery. | | | | | | Afognak hatchery. | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Red, or sockeye. | | Coho, or silver. | | Steelhead trout. | | Red, or sockeye. | | Humpback. | |
| | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. |
| 1906 | 7,631,480 | 6,638,550 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1907 | 58,210,000 | 54,610,800 | ..... | ..... | 182,000 | 143,500 | ..... | ..... | ..... | ..... |
| 1908 | 65,550,000 | 61,369,000 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 1909 | 50,000,000 | 18,653,000 | 17,000 | 9,900 | ..... | ..... | 46,380,000 | 39,325,870 | 12,000 | 10,000 |
| 1910 | 72,000,000 | 69,879,600 | ..... | ..... | ..... | ..... | 76,020,000 | 71,647,170 | 499,400 | 363,740 |
| Total | 252,791,480 | 241,150,950 | 17,000 | 9,900 | 182,000 | 143,500 | 122,400,000 | 110,973,040 | 511,400 | 373,740 |

OUTPUT OF THE SALMON HATCHERIES IN ALASKA OWNED BY THE UNITED STATES BUREAU OF FISHERIES, 1906 TO 1910—Continued.

| Year ending June 30— | Total by species. | | | | | | | | Grand total. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Red, or sockeye. | | Coho, or silver. | | Humpback. | | Steelhead trout. | | | |
| | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. |
| 1906 | 7,031,480 | 6,638,550 | | | | | | | 7,031,480 | 6,638,550 |
| 1907 | 58,210,000 | 54,610,800 | | | | | 182,000 | 143,500 | 58,392,000 | 54,754,300 |
| 1908 | 65,550,000 | 61,369,000 | | | | | | | 65,550,000 | 61,369,000 |
| 1909 | 96,380,000 | 87,978,870 | 17,000 | 9,900 | 12,000 | 10,000 | | | 96,409,000 | 87,998,770 |
| 1910 | 148,020,000 | 141,526,770 | | | 499,400 | 363,740 | | | 148,519,400 | 141,890,510 |
| Total | 375,191,480 | 352,123,990 | 17,000 | 9,900 | 511,400 | 373,740 | 182,000 | 143,500 | 375,901,880 | 352,651,130 |

OUTPUT OF PRIVATE SALMON HATCHERIES OF ALASKA, 1893 TO 1910.

NOTE.—Unless otherwise stated in footnotes, all of the fry liberated were red salmon.

| Year ended June 30— | Callbreath's hatchery. | | Karluk hatchery. | | Klawak hatchery. | |
|---|---|---|---|---|---|---|
| | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. |
| 1893 | 900,000 | 600,000 | | | | |
| 1894 | 3,000,000 | 2,204,000 | | | | |
| 1895 | 6,300,000 | 5,291,000 | | | | |
| 1896 | 6,200,000 | 5,475,000 | | | | |
| 1897 | 4,400,000 | 4,390,000 | 3,236,000 | 2,556,440 | | |
| 1898 | 3,400,000 | 2,526,000 | 8,454,000 | 6,340,000 | 2,023,000 | 800,000 |
| 1899 | 3,000,000 | 2,050,000 | 4,491,000 | 3,369,000 | 3,600,000 | 3,000,000 |
| 1900 | 3,400,000 | 2,335,000 | 10,496,900 | 7,872,000 | 3,600,000 | [a] 1,000,000 |
| 1901 | [b] | | 19,334,000 | 15,566,800 | [c] | |
| 1902 | 6,000,000 | 5,500,000 | 32,800,000 | 28,700,000 | 3,500,000 | 2,800,000 |
| 1903 | 6,000,000 | 5,000,000 | 23,400,000 | 17,555,000 | 3,500,000 | 1,500,000 |
| 1904 | 6,000,000 | 5,000,000 | 28,113,000 | 22,000,000 | 3,000,000 | 1,700,000 |
| 1905 | 6,050,000 | 5,250,000 | 45,500,000 | 33,670,000 | 2,800,000 | 2,000,000 |
| 1906 | 7,700,000 | 6,500,000 | 36,933,000 | 28,236,412 | 2,800,000 | 2,300,000 |
| 1907 | [d] | [d] | 38,679,200 | 36,846,000 | 3,600,000 | 1,187,000 |
| 1908 | [e] | [e] | 47,808,200 | 43,655,000 | 3,500,000 | 2,776,000 |
| 1909 | [e] | [e] | 40,320,000 | 37,105,000 | 3,500,000 | 3,200,000 |
| 1910 | [e] | [e] | 45,228,000 | 40,620,000 | 5,800,000 | 5,300,000 |
| Total | [f] 63,350,000 | 52,121,000 | 384,793,300 | 324,091,652 | 41,223,000 | 27,563,000 |

| Year ended June 30— | Hetta hatchery. | | Quadra Bay hatchery. | | Freshwater Bay hatchery. | |
|---|---|---|---|---|---|---|
| | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. |
| 1893 | | | | | | |
| 1894 | | | | | | |
| 1895 | | | | | | |
| 1896 | | | | | | |
| 1897 | | | | | | |
| 1898 | | | | | | |
| 1899 | 2,800,000 | 2,600,000 | | | | |
| 1900 | 2,000,000 | 1,500,000 | | | | |
| 1901 | 1,800,000 | [a] 500,000 | | | | |
| 1902 | 2,500,000 | 1,700,000 | 4,500,000 | 3,500,000 | 1,500,000 | 1,000,000 |
| 1903 | 4,800,000 | 4,000,000 | 5,500,000 | 4,000,000 | [b] | [b] |
| 1904 | 5,127,500 | 3,750,000 | 600,000 | [c] 400,000 | [d] | [d] |
| 1905 | [g] | [g] | [g] | [g] | [g] | [g] |
| 1906 | [g] | [g] | [g] | [g] | [g] | [g] |
| 1907 | [g] | [g] | [g] | [g] | [g] | [g] |
| 1908 | 8,000,000 | 6,125,000 | [g] | [g] | [g] | [g] |
| 1909 | 8,400,000 | 8,134,000 | 3,325,000 | 3,025,750 | [g] | [g] |
| 1910 | 10,313,000 | 9,000,000 | 10,863,000 | 9,850,000 | [g] | [g] |
| Total | 45,740,500 | 37,309,000 | 24,788,000 | 20,775,750 | 1,500,000 | 1,000,000 |

[a] Many eggs frozen.
[b] No run of fish.
[c] Hatchery was not used, the eggs being hatched out in the lake.
[d] No report.
[e] Fish coming in to spawn were lifted over the dam.
[f] A considerable proportion of these are coho eggs.
[g] Not operated.

OUTPUT OF PRIVATE SALMON HATCHERIES OF ALASKA, 1893 TO 1910—Continued.

| Year ended June 30— | Fortmann hatchery. | | Kell Bay hatchery. | | Total. | |
|---|---|---|---|---|---|---|
| | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. | Eggs taken. | Fry liberated. |
| 1893 | | | | | 900,000 | 600,000 |
| 1894 | | | | | 3,000,000 | 2,204,000 |
| 1895 | | | | | 6,300,000 | 5,291,090 |
| 1896 | | | | | 6,200,000 | 5,475,000 |
| 1897 | | | | | 8,636,000 | 6,946,440 |
| 1898 | | | | | 13,877,000 | 9,666,000 |
| 1899 | | | | | 13,891,000 | 11,019,000 |
| 1900 | | | | | 19,496,900 | 12,707,000 |
| 1901 | | | | | 21,134,000 | 16,066,800 |
| 1902 | 11,460,000 | 10,300,000 | | | 62,260,000 | 53,500,000 |
| 1903 | 40,050,000 | 29,005,000 | 2,500,000 | 2,000,000 | 85,750,000 | 63,060,000 |
| 1904 | 22,203,000 | 13,780,000 | (a) | (a) | 68,043,500 | 46,630,005 |
| 1905 | 65,010,000 | 63,181,000 | (a) | (a) | 119,360,000 | 104,101,006 |
| 1906 | 68,715,000 | 67,643,000 | (a) | (a) | 116,148,000 | 104,679,412 |
| 1907 | 105,450,000 | 80,973,000 | (a) | (a) | 147,729,209 | 119,006,000 |
| 1908 | [b] 41,280,000 | 33,920,000 | (a) | (a) | 100,588,200 | 86,476,000 |
| 1909 | 24,465,000 | 22,785,000 | (a) | (a) | 80,010,000 | 74,249,750 |
| 1910 | 53,340,000 | 50,725,000 | (a) | (a) | 125,544,000 | 115,495,000 |
| Total | 431,973,000 | 372,312,000 | 2,500,000 | 2,000,000 | 995,867,800 | 837,172,462 |

[a] Not operated.

[b] Includes 30,000 coho eggs taken and 27,000 fry liberated.

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